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PLATES.

I.

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CONTENTS.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE TROPICAL PACIFIC, in charge of ALEXANDER AGASSIZ, by the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander JEFFERSON F. MOSER, U. S. N., Commanding. IV. THE CORAL REEFS OF THE TROPICAL PACIFIC. By ALEXANDER AGASSIZ. pp. xxxiii., 410. 238 Plates. February, 1903.

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IV.

THE CORAL REEFS

OF THE

TROPICAL PACIFIC.

By ALEXANDER AGASSIZ.

I. — PLATES 1 TO 105.

CALIFORNIA TO SOCIETY ISLANDS.

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CAMBRIDGE, U. S. A.:
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PLATE 1.

Plate 1.

Chart of the Pacific Ocean, showing the track of the United States Fish Commission Steamer "Albatross" during her expedition to the Tropical Pacific from August, 1899 to March, 1900.

PLATE 2.

Plate 2.

MARQUESAS.

1. Cliffs to the west of the entrance to Taï-o-haé Bay (Anna Maria Bay).

W. McM. Woodworth, Phot.

2. Eroded volcanic rocks near Taï-o-haé Bay.

1

HELIOTYPE CO., BOSTON.

2

PLATE 3.

PLATE 3.

MARQUESAS.

Head of Tai-o-haé Bay. H. C. Fassett, Phot.

HELIOTYPE CO., BOSTON

PLATE 4.

Plate 4.

RANGIROA.

1. Avatoru Pass seen from the sea, Brander Island on one side of pass.

Max. Agassiz, Phot.

2. Shingle and sand beach on the east side of Avatoru Pass. W. McM. W., Phot.

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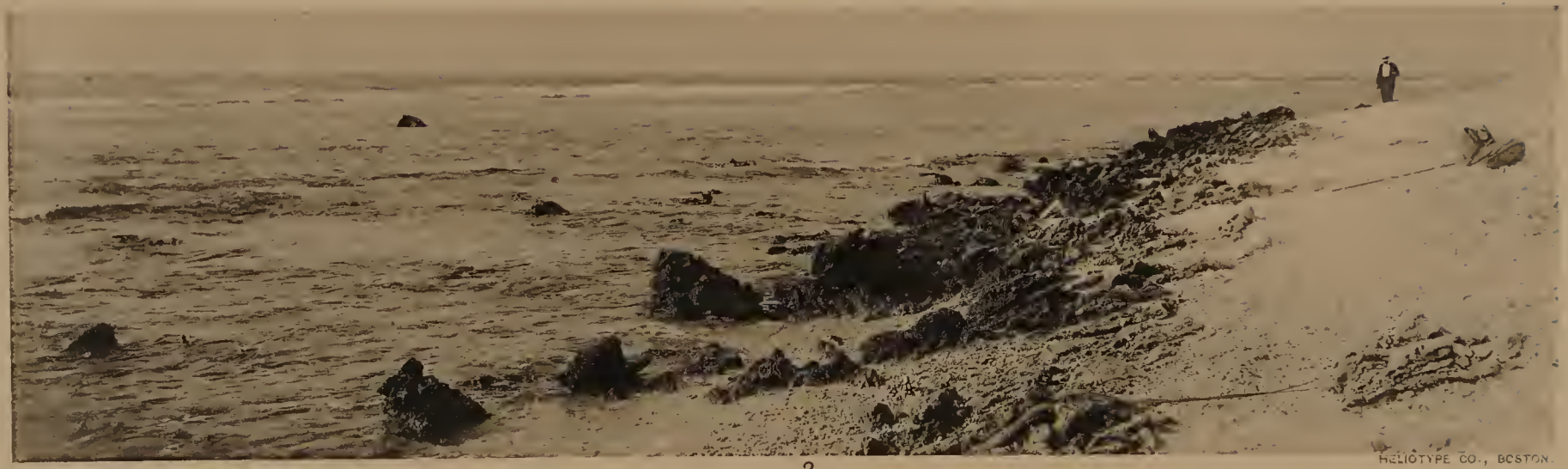

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HELIOTYPE CO., BOSTON.

PLATE 5.

PLATE 5.

Shingle beach on the west side of Avatoru Pass, Rangiroa. M. A., Phot.

HELIOTYPE CO., BOSTON.

PLATE 6.

Plate 6.

RANGIROA.

1. Lagoon shore, east side of Avatoru Pass.

2. Beach of lagoon east of Atimaro village, opposite the anchorage.

1, 2, M. A., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 7.

Plate 7.

RANGIROA.

1. Mohican Island and spit connecting it with Brander Island. M. A., Phot.

2. Western spit of Mohican Island reaching into the lagoon, seen looking towards Avatoru Pass, Brander Island on the left. H. C. F., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 8.

Plate 8.

RANGIROA.

1. First gap west from Tiputa, looking west, sea face of the land rim.

2. Sea face of same, looking south, to show old ledge and channel of gap.

1, 2, M. A., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 9.

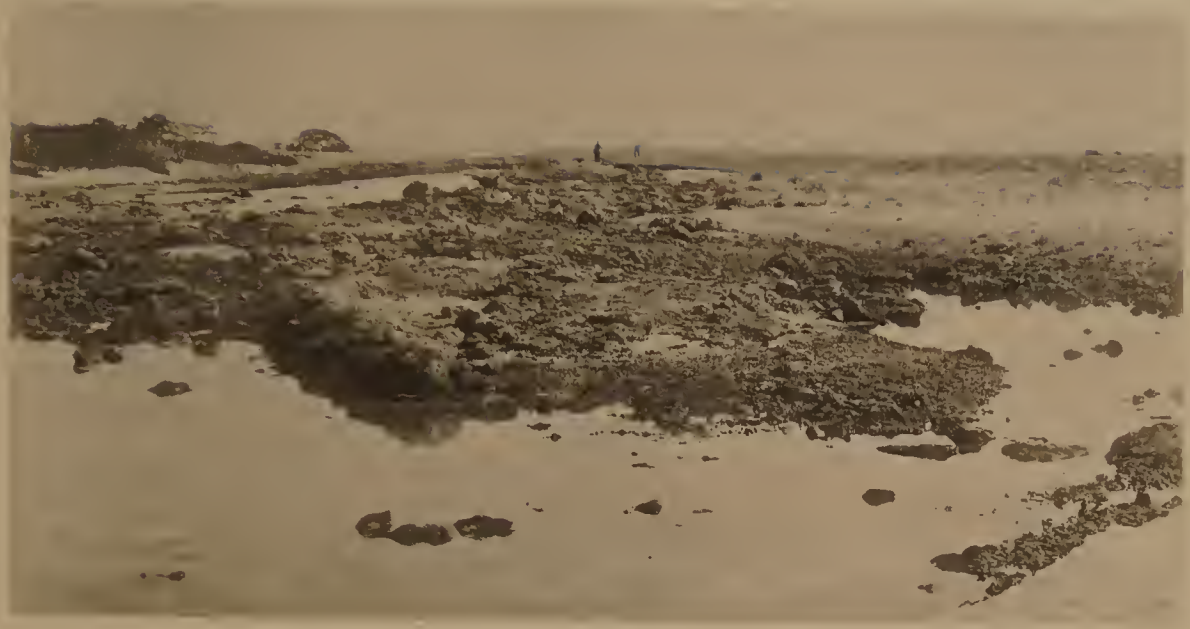
Plate 9.

RANGIROA.

1. First gap east from Tiputa, looking towards the sea face from the lagoon.

W. McM. W., Phot.

2. Lagoon side of the first gap east from Tiputa. M. A., Phot.



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HELIOTYPE CO., BOSTON.

2

PLATE 10.

Plate 10.

RANGIROA.

1. Lagoon side of the second gap west of Tiputa.

2. Looking seaward across the second gap west of Tiputa.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 11.

Plate 11.

RANGIROA.

1. Coral boulder at the base of the sand beach on the edge of the third gap west of Tiputa Pass.

2. Sea face of the third gap west of Tiputa.

1, 2, M. A., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 12.

Plate 12.

RANGIROA.

1. Looking into the lagoon from the west side of Avatoru Pass. M. A., Phot.

2. Sand beach and boulder flat on the sea face of the third gap west of Tiputa.
W. McM. W., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 13.

Plate 13.

RANGIROA.

1. West shore of Rangiroa north of Funuarua Island seen from the sea.
2. Looking towards the lagoon across the third gap west of Tiputa.

1, 2, M. A., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **14**.

Plate 14.

RANGIROA.

1. Islets and wall of old ledge on the south side of the western land rim.

2. Islets and wall of old ledge on the south side of the western land rim.

3. Islets and wall of old ledge on the south side of the western land rim.

1–3. W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 15.

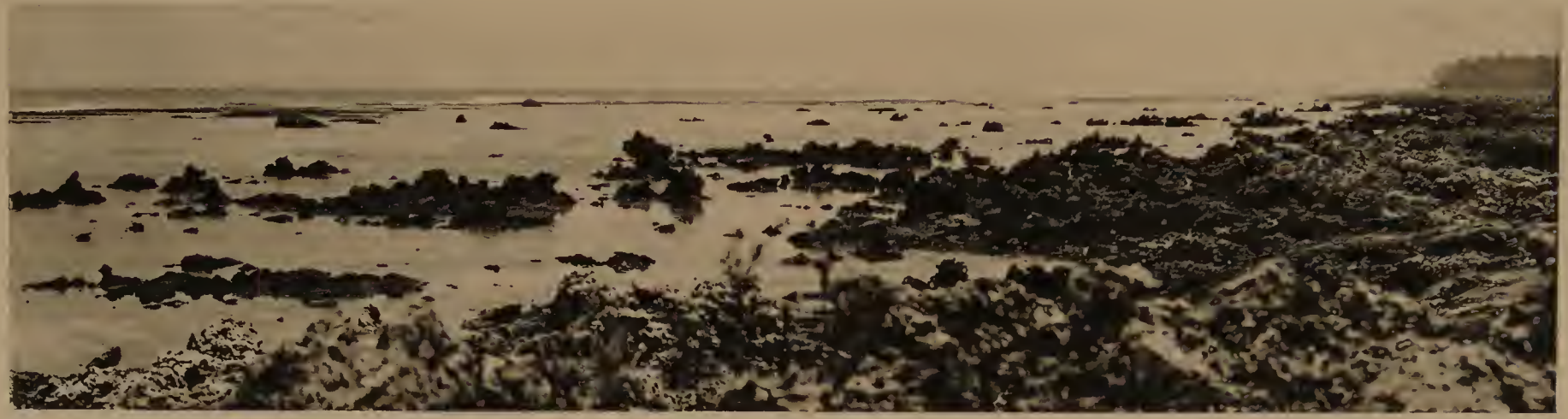
Plate 15.

RANGIROA.

1. South side of atoll, old ledge wall seen from the lagoon looking west.

W. McM. W., Phot.

2. South side of atoll, looking along the base of the old ledge sea wall from the reef flat platform. M. A., Phot.



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HELIOTYPE CO., BOSTON.

PLATE 16.

Plate 16.

RANGIROA.

1. Lagoon beach, south side of atoll. W. McM. W., Phot.
2. Gap in land rim, south side of atoll, seen from the lagoon side looking towards old ledge sea wall, outliers of sea wall protruding in the gap. M. A., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 17.

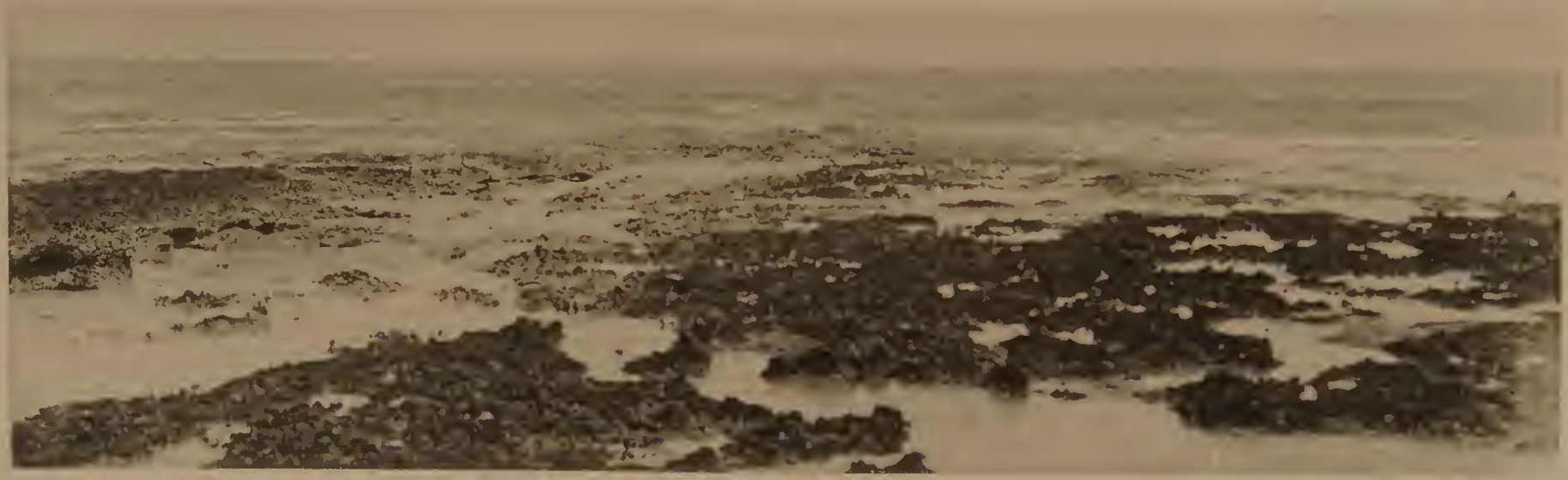
Plate 17.

RANGIROA.

1. Reef flat platform, sea face of south side of atoll, looking seaward.

2. Sea face of south side of atoll, looking along the base of the old ledge sea wall.

1, 2, W. McM. W., Phot.



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HELIOTYPE CO., BOSTON.

PLATE 18.

Plate 18.

RANGIROA.

1. South side of atoll, looking along the base of the old ledge sea wall. M. A., Phot.
2. Large blocks of Astrean and Porites *in situ* on small islet in middle of lagoon, south of Mohican Island. W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 19.

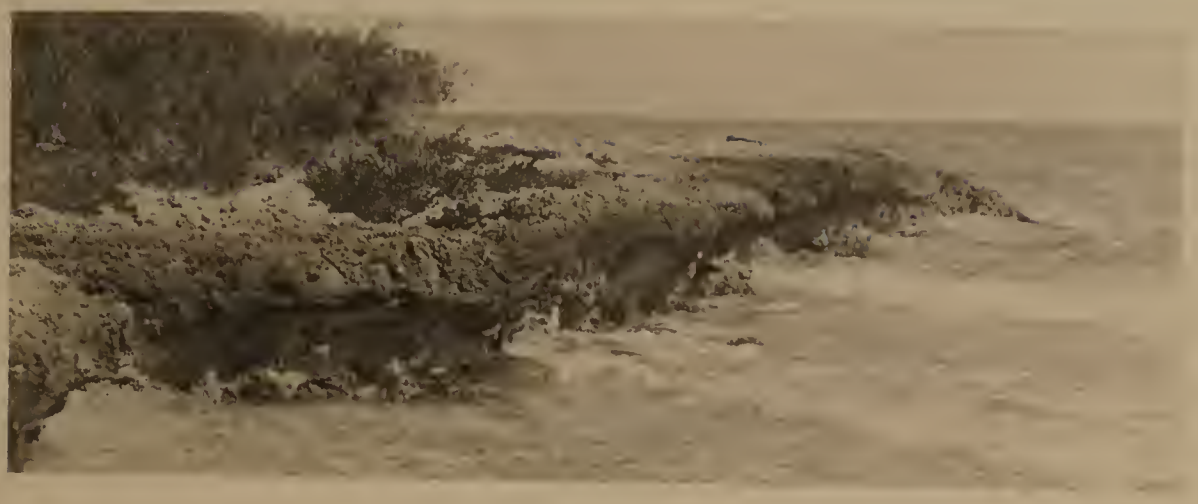
Plate 19.

RANGIROA.

1. Old ledge on the shore of small islet in middle of lagoon.

2. Beach rock and recent coral boulders thrown up on the east shore of the same islet.

1, 2, W. McM. W., Phot.



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HELIOTYPE CO., BOSTON.

2

PLATE 20.

Plate 20.

1. Entrance to Matahiva on northeast extremity of the atoll.
2. West shore of Tikahau, looking southeast.
3. Land rim and gap on the southwest shore of Tikahau.
4. Wide reef flat platform, southwest shore of Tikahau, looking southeast.

1–4, W. McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 21.

Plate 21.

MAKATEA.

1. Central part of west shore of the island. Cañon leading to the sink on the summit of the island is behind the village.

2. Lowest part of the west side of the island.

3. Northern point, seen from the west side.

1–3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 22.

Plate 22.

MAKATEA.

1. Highest point of the island, seen from the west.

2. Northern point of the island, looking southeast; elevated coralliferous limestone.

1, 2, A. G. Mayer, Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 23.

Plate 23.

Elevated coralliferous limestone cliffs on the western face of Makatea, looking south.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 24.

Plate 24.

Cliffs on the western face of Makatea, looking north over the narrow reef flat platform.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 25.

Plate 25.

Cliffs on the northern point of Makatea, looking over the reef flat platform.

W. McM. W., Phot.

HELIOTYPE CO., BOSTON.

PLATE 26.

Plate 26.

MAKATEA.

1. North point of the island, looking eastward.
2. West face of the island, showing the coral sand beach and the reef flat platform, looking south.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON

PLATE 27.

Plate 27.

Elevated coralliferous limestone cliffs on the east face of Makatea, south of the village, showing the undercutting at the base, the lines of caverns, and the stalactites along the face of the cliffs and over the openings of the caverns. W. McM. W., Phot.

HELIOTYPE CO., BOSTON.

PLATE 28.

Plate 28.

MAKATEA.

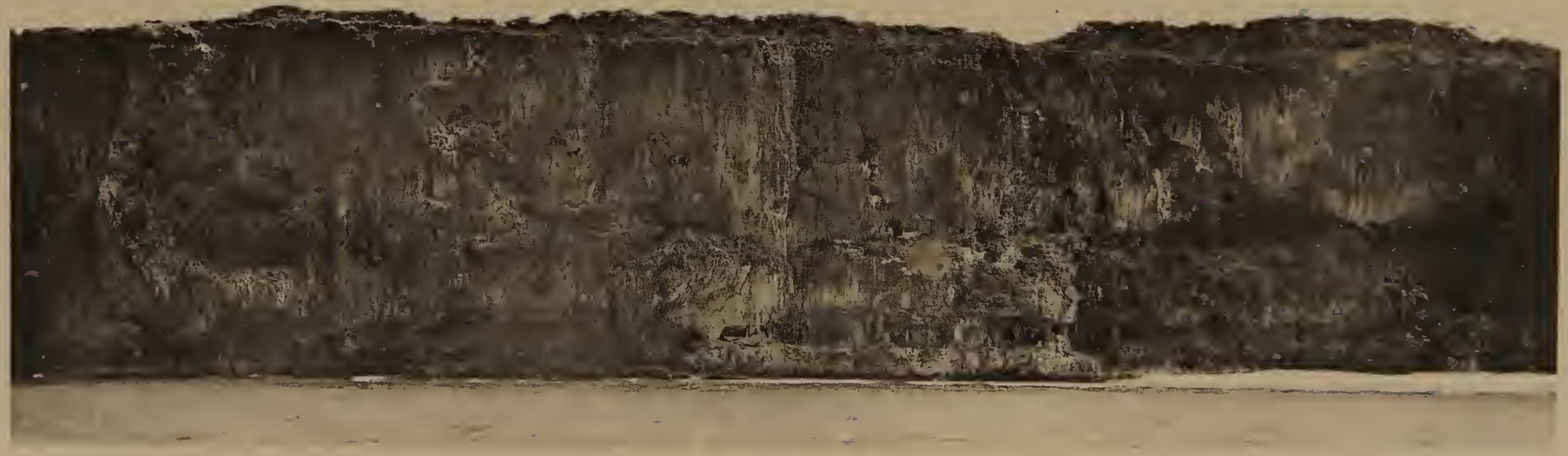
1. Cliffs on the east face of the island. The first terraces are sloughed off; long coral sand beach at the base of the cliffs, near the southern end of the island.

W. McM. W., Phot.

2. Cliffs on the east face of the island, with a short coral sand beach at the base; the lower terraces are beginning to slough off near the southern extremity of the island.

A. G. M., Phot.

1



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HELIOTYPE CO., BOSTON.

PLATE 29.

Plate 29.

MAKATEA.

1. Showing the terraces on the south face of the island, with horses of elevated reef rock of the first terrace, separated by short coral sand beaches.

2. Terraces of the east face of the island, near the southern extremity, with beaches and horses of the old ledge.

3. Terraces of the east face of the island, with beaches and horses, near the southern end of the island.

1–3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 30.

Plate 30.

Cañon leading up the cliffs of the west face of Makatea to the path winding across the summit sink to the east face of the island. C. H. Townsend, Phot.

HELIOTYPE CO., BOSTON.

PLATE **31**.

Plate 31.

MAKATEA.

1. Cañon through the summit of the cliffs on the west side, opening on the path leading to the east side of the island.

2. Spires and pinnacles of old ledge along the path leading across the central plateau of the island.

1, 2, C. H. T., Phot.

2

HELIOTYPE CO., BOSTON

1

PLATE 32.

Plate 32.

MAKATEA.

1. Old ledge pinnacles in the central part of the sink of the island.

2. Old ledge pinnacles in the central part of the sink of the island.

1, 2, C. H. T., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 33.

Plate 33.

Reef flat platform, on the west shore of Niau, with undercut ledges and horses of elevated coralliferous limestone. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 34.

Plate 34.

NIAU.

1. Outcrop of old ledge in the central part of the land rim of the island.
2. Outcrops of old ledge on the reef flat platform of the west face of the island.
3. Low undercut elevated coralliferous limestone bluffs on the south shore of the island.

1–3, W. McM. W., Phot.

2

1

3

HELIOTYPE CO., BOSTON.

PLATE 35.

Plate 35.

NIAU.

1. Outcrop of old ledge near the lagoon, west face of the island.

2. Outcrop of old ledge near the lagoon, west face of the island.

1, 2, A. G. M., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 36.

Plate 36.

Lagoon shore, west face of Niau; the old ledge crops out on the right. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 37.

Plate 37.

APATAKI.

1. Southwest shore of atoll, seen from the sea, showing the low land rim, with its islands and islets and submerged flats.

2. Land rim with partly submerged flats.

3. Looking northwest, on lagoon side of land rim east of Pakaka Pass.

1–3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 38.

Plate 38.

APATAKI.

1. Pakaka Pass, seen from the sea, looking into the lagoon.
2. Gap across the land rim to the east of Pakaka Pass.
3. Looking out to sea, across Pakaka Pass, from the lagoon side.

1–3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 39.

Plate 39.

APATAKI.

1. Low flats of the lagoon, east of Pakaka Pass.

2. Lagoon beach of land rim east of Pakaka Pass, looking northwest.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 40.

Plate 40.

1. Vegetation of land rim, lagoon side of Apataki. C. H. T., Phot.
2. Boulder beach outside of channel leading to central sink of Tikeï.
3. West shore of Tikeï, south end of high coral sand beach.
4. West shore of Tikeï, north end of high coral sand beach.

2–4, W. McM. W., Phot.

1

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4

HELIOTYPE CO., BOSTON.

PLATE 41.

Plate 41.

TIKEÏ.

1. Gap forming pass leading from the sea face to the interior sink.

2. Cut leading from gap to the inner sink.

1, 2, A. G. M., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 42.

Plate 42.

Wide passage leading from the gap (Pl. 41, fig. 1) to the central pool of Tikeï.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 43.

Plate 43.

TIKEÏ.

1. Marshy flat near the pool of the central sink. W. McM. W., Phot.

2. Marshy flat connecting the central sink with the wide passage to the sea (Pl. 42).
A. G. M., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 44.

Plate 44.

Sink with pool showing an outcrop of the old ledge, near the central part of Tikei.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 45.

Plate 45.

KAUEHI.

1. West shore, seen from the sea, looking across the lagoon to the islands of the opposite face, showing masses of boulders flanked by elevated undercut ledges of coralliferous limestone.

2. Wide gap across the land rim of the west face of the atoll, seen from the sea.

A. G. M., Phot.

3. Mass of large boulders on the west face of the land rim, partly recent coral conglomerate, partly old ledge, still attached to the narrow reef flat platform.

1, 3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 46.

Plate 46.

FAKARAVA.

1. Partly submerged land rim of the west face of the atoll, islands and islets of the northwestern part of the lagoon. A. G. M., Phot.

2. Island on east side of Ngarue Pass, looking east while in the pass.

3. Lagoon face of land rim, west of Rotoava village, showing the low beach rock beach, seen from the anchorage.

2, 3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 47.

Plate 47.

FAKARAVA.

1. Ledges, islets, and islands in northwestern part of atoll (Pl. 204), seen from the island nearest to the Rotoava anchorage.

2. Ledge in the lagoon between Ngarue Pass and Rotoava.

3. One of the islands of the cluster in the northwestern part of the lagoon, the one nearest to the Rotoava anchorage.

4. North face of the same island, flanked by old ledge rock, with ledge of the same seen in the distance.

1–4, W. McM. W., Phot.

1

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HELIOTYPE CO., BOSTON.

4

PLATE 48.

PLATE 48.

Sink and pool south of Rotoava village, Fakarava. W. McM. W., Phot.

HELIOTYPE CO., BOSTON.

PLATE 49.

Plate 49.

Low beach rock cliffs of lagoon face of land rim near Rotoava village, Fakarava, part of Fig. 3, Pl. 46. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 50.

Plate 50.

FAKARAVA.

Sea face shingle beach with characteristic vegetation of the land rim of a Paumotu atoll.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

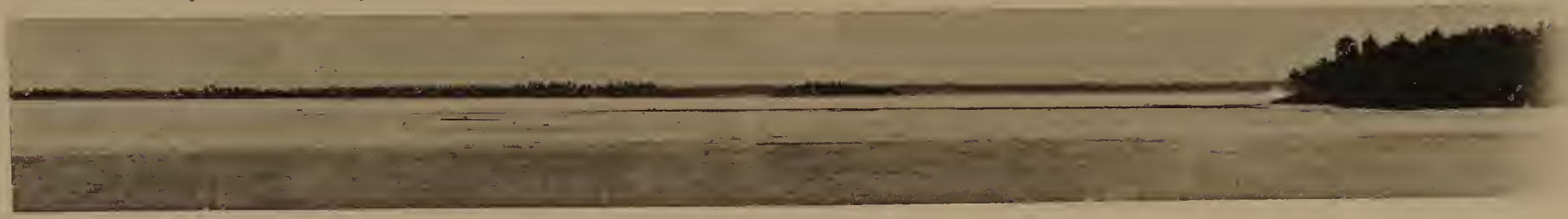
PLATE 51.

Plate 51.

1. Looking over the partly submerged land rim across to islets in the lagoon of Anaa, seen from the sea.

2. Beach rock on the sea face of the shingle beach to the east of Rotoava village, Fakarava, showing Nullipore knolls to the left of the reef platform.

1, 2, A. G. M., Phot.



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HELIOTYPE CO., BOSTON.

PLATE 52.

Plate 52.

ANAA.

1. Northwest point of the atoll, showing undercut elevated coralliferous limestone ledges with outliers of the same on the reef flat platform. W. McM. W., Phot.

2. Gap on the northwest shore of the land rim, looking into the lagoon towards the land rim on the opposite face.

3. Horn and reef flat platform on the northwestern side of the atoll, seen from the sea.

2, 3, A. G. M., Phot.

1

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3

HELIOTYPE CO., BOSTON.

PLATE 53.

Plate 53.

ANAA.

1. Part of the eastern shore flanked by low undercut elevated coralliferous limestone ledges and horses, separated by short coral sand beaches.

2. A more northerly part of the east face land rim, covered with small islands, separated by high gaps, with shingle beaches flanked by recent and old ledge boulders.

3. Submerged north face land rim with a prominent islet, looking across the shallow lagoon flat to the land rim of the opposite face.

1–3, A. G. M., Phot.

1

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HELIOTYPE CO., BOSTON.

PLATE 54.

Plate 54.

TAHANEA.

1. Island on the horn formed by the sweep of the reef flat platform on the west side of the atoll, seen from the sea.

2. Reef flat platform on the east face, at the curve leading to the southwest point, seen from the sea.

3. Southeast face of the atoll, seen from the sea, looking across the outer reef flat to the island on the inner platform of the secondary lagoon.

1, 2, W. McM. W.; 3, A. G. M., Phot.

1

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HELIOTYPE CO., BOSTON.

PLATE 55.

Plate 55.

TAHANEA.

1. Islands running at right angle to the face of the atoll, on the land rim of the southeast shore, seen from the sea. W. McM. W., Phot.

2. Islet and bars at right angle to the face of the atoll, on the west shore of the atoll, seen from the sea.

3. Narrow bare land rim of outer reef platform, on the north face of the atoll, seen from the sea.

4. Island and bars in the lagoon on the south face of the atoll, looking over the narrow land rim from the sea. The island is on the north side of the secondary lagoon.

2–4, A. G. M., Phot.

1

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HELIOTYPE CO., BOSTON.

4

PLATE 56.

Plate 56.

TAKUME.

1. Looking across the horn of the north end of the atoll, seen from the sea.

2. Looking across the gap in the land rim of the northwest face of the atoll, island on the opposite face looming up, seen from the sea.

3. Looking into the lagoon across a low gap of the land rim on the northwest face of the atoll, seen from the sea.

1, 2, A. G. M.; 3, W. McM. W., Phot.

1

2

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HELIOTYPE CO., BOSTON.

PLATE 57.

Plate 57.

TAKUME.

1. Islets on the land rim of the east face of the atoll, looking across the lagoon to the islands of the west face, seen from the sea.

2. Looking across a shallow gap in the land rim of the northwest side of the atoll, seen from the sea, breakers of the east face seen across the lagoon.

3. Boulders of old ledge on the northwest face of the atoll, looking across the lagoon, seen from the sea.

4. Islet and bars on the land rim at right angle to the east face of the atoll, islets of the west face seen across the lagoon, seen from the sea.

1–4, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 58.

Plate 58.

1. Land rim on the north side of Fakarava (lagoon face), distant ledges seen in the lagoon. A. G. M., Phot.

2. Looking into the lagoon of Takume across a narrow gap on the northwest face of the atoll. W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 59.

Plate 59.

MAKEMO.

1. Looking across the pass on the northeast face, from the lagoon side.

2. Looking across the entrance to the same pass from the sea face, showing the outer shingle beach, the rolled boulders at the base, the narrow reef flat platform, and the outer edge of Nullipore knolls.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 60.

Plate 60.

MAKEMO.

1. Land rim of the northeast face of the atoll, broken by gaps, seen from the lagoon side.

A. G. M., Phot.

2. Continuous land rim on the northeast face of the atoll, seen from the lagoon side.

3. Sea face of the northeast land rim of the atoll, showing the shingle beach flanked by coral boulders at the base, the outer line of Nullipore knolls flanking the outer edge of the reef flat platform lagoon.

2, 3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 61.

Plate 61.

MAKEMO.

1. Looking out to sea, from a low coral sand dam thrown across the lagoon face of a shallow gap, showing the shingle dam thrown across the sea face of the gap.

2. Looking towards the lagoon from the sea face of a gap of the land rim, across a narrow channel cut through old ledge rock capped with modern conglomerate.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 62.

Plate 62.

MAKEMO.

1. Shingle and rubble beach on the sea face, with line of Nullipore knolls on the outer edge of the narrow reef flat platform lagoon running parallel to the beach.

2. Sea face shingle beach with rolled coral boulders at the base, and outliers of the old ledge cropping out, on the reef flat platform, between the base of the shingle beach and the outer line of Nullipore knolls, forming the head of one of the reef flat platform lagoons.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 63.

Plate 63.

MAKEMO.

1. Outer edge of knolls of Nullipores flanking the reef flat platform lagoon running parallel to the sea face shore line.

2. Sea face of atoll, showing the outer reef flat platform with its Nullipore edge, and base of the land rim flanked by a mass of material to form a conglomerate bedding covering the underlying old ledge.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 64.

Plate 64.

MAKEMO.

Coral shingle, rubble, and small boulders on the summit of the beach on the sea face, encroaching upon the vegetation of the land rim. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 65.

Plate 65.

MAKEMO.

1. Sea face, showing the outer line of Nullipore knolls forming the edge of the reef flat platform, covered with numerous outliers of the old ledge. A large undercut outlier of the old ledge, capped with recent conglomerate, stands on the left of the figure.

2. Worn recent corals, coral boulders, and fragments of old ledge on the face of the sea beach, capping the underlying old ledge.

1, 2, W. McM. W., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 66.

Plate 66.

TEKOKOTA.

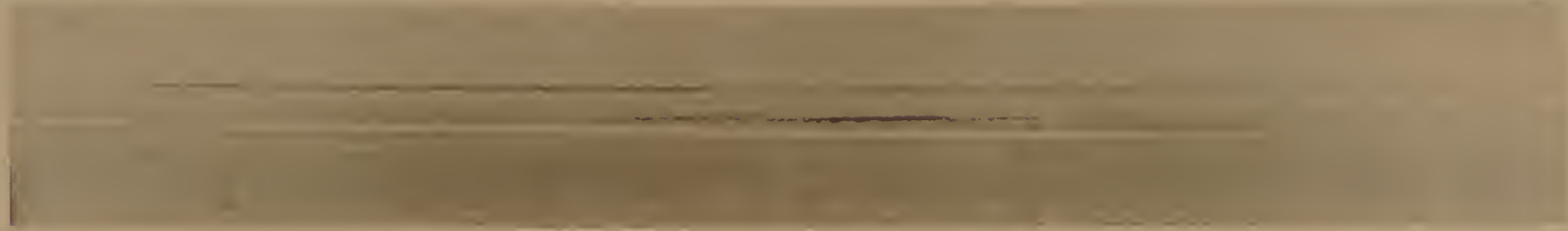
1. Looking across the lagoon of the atoll over the land rim of the west face, showing bar of shingle at right angle to the sea face.

2. Looking across the northwestern horn of the atoll.

3. Islets running at right angle to the reef platform of the west face of the land rim, looking across the lagoon of the atoll from the sea.

4. Looking across the land rim of the southwest face of the atoll, showing islet at right angle to the face, and the land rim of the opposite face.

1, 4, W. McM. W.; 2, 3, A. G. M., Phot.



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HELIOTYPE CO., BOSTON.

4

PLATE 67.

Plate 67.

HAO.

1. A part of the west face of the atoll, with a wide reef flat; a few islands and bars form the land rim.
2. A part of the west face of the land rim, with islands and bars on the edge of the reef flat platform.
3. Northwest point of the atoll, looking across the horn of the lagoon, seen from the sea.
4. Wide gap on the west face of the atoll, looking into the lagoon from the sea.

1–4, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 68.

Plate 68.

AKI-AKI.

1. Island of Aki-Aki seen from the south.
2. Western part of the island.
3. Eastern part of the island.

1–3, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 69.

Plate 69.

AKI-AKI.

1. Scrub vegetation of sink near the central part of the island.

2. Fresh-water sink surrounded by cocoanut trees, near the central part of the island.

1, 2, C. H. T., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 70.

Plate 70.

1. West face of Marokau, looking across the wide reef flat into the lagoon.

2. Northern extremity of Ravahere, looking across the wide bare reef flat of the west face, showing the islands on the east face of the atoll.

3. Horn of the western extremity of Nukutavake, showing reef flat platform lagoon at the base of a high shingle and coral sand beach, seen from the sea.

4. Sand dunes on the east face of Nukutavake, overwhelming the vegetation of the land rim, line of Nullipore knolls on outer edge of reef flat platform, seen from the sea.

1–4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 71.

Plate 71.

NUKUTAVAKE.

1. Vegetation near the central part of the island.

2. Sink surrounded by cocoanut trees, near the middle of the island.

1, 2, A. G. M., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 72.

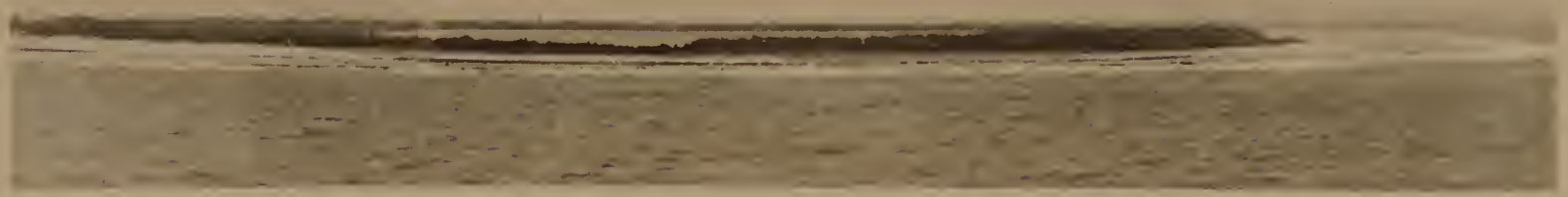
Plate 72.

PINAKI.

1. Atoll seen from the foretop, showing the old gap on the southeast side.
W. McM. W., Phot.

2. Entrance to the atoll, seen from the south side. C. H. T., Phot.

3. Entrance to the atoll, seen from the south side. A. G. M., Phot.



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HELIOTYPE CO., BOSTON.

PLATE 73.

Plate 73.

PINAKI.

1. Western horn of the atoll.
2. Low gap across the eastern land rim of the atoll, seen from the southeast.
3. Sand dunes overwhelming the vegetation on the southeast face of the atoll, ancient wide gap on the right.

1–3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE **74.**

Plate 74.

PINAKI.

1. Looking across the lagoon side of entrance into atoll, Tridacna islets in the background.
2. Looking into the lagoon of the atoll, from the reef flat platform, showing old ledge outcrops.

1, 2, C. H. T., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 75.

Plate 75.

1. Tridacna islets in the lagoon of Pinaki.
2. On the reef flat platform at the entrance into the lagoon of Pinaki, looking west.
3. Windrows of Tridacnas on the lagoon face of the land rim near the entrance into Pinaki.
4. Vegetation of the land rim of Makemo.

1–4, C. H. T., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 76.

Plate 76.

NUKUTIPIPI.

1. Looking into the lagoon across the wide gap on the sea face of the land rim of the atoll; the reef flat platform lagoon runs parallel to the land rim; the land rim of the opposite face of the atoll is seen across the lagoon.

2. Extremity of island forming the land rim of the western face of the atoll; the reef flat platform lagoon is very prominent.

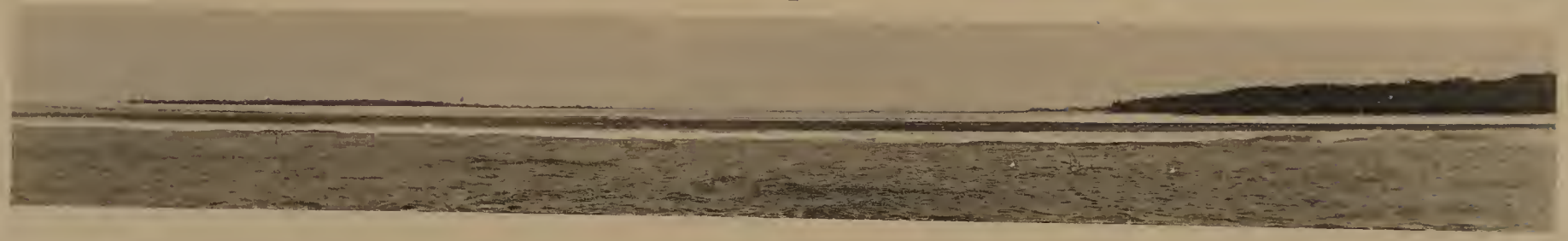
3. Northern end of island forming the west face of the atoll, looking into the lagoon from the sea.

4. Western point of the atoll as seen coming from the south. The reef flat platform lagoon is specially well developed at Nukutipipi, as shown on Figs. 1–4 of this plate.

1–4, A. G. M., Phot.

1

2



3

4

HELIOTYPE CO., BOSTON.

PLATE 77.

Plate 77.

NUKUTIPIPI.

1. Looking across the broad reef flat platform lagoon on the south face of the atoll, with the edge of Nullipore knolls on the sea face of the reef flat.

W. McM. W., Phot.

2. Looking into the lagoon to the opposite land rim, across the wide gap on the northwest face of the atoll.

3. Looking into the lagoon from the southwest, over the wide reef flat platform and the lagoon flat.

4. Looking across the reef flat platform lagoon, near the northwest point of the atoll.

2–4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 78.

Plate 78.

ANU-ANURUNGA.

1. Looking into the lagoon across the broad reef flat covered with rocky and sandy bars running at right angle to the face of the atoll. W. McM. W., Phot.

2. The northern extension of the same view. C. H. T., Phot.

3. Southwest face of the atoll, looking over the edge of Nullipore knolls, across the broad reef flat platform lagoon. A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 79.

Plate 79.

HEREHERETUE.

1. Looking into the lagoon over the reef flat platform and lagoon flats of the northeast face of the atoll.

2. The southeast horn of the atoll, showing the high coarse shingle beach, the narrow reef flat platform lagoon and low gap on the right.

3. Looking into the lagoon, through a wide gap, over a submerged reef flat on the western face of the atoll.

1 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON

PLATE 80.

Plate 80.

HEREHERETUE.

1. Looking over a narrow reef flat on the southeast face of the atoll, flanking a high coral sand beach overwhelming the vegetation of the land rim.

2. High sand and coral shingle beach flanking the southeast face of the atoll.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON

PLATE **81**.

Plate 81

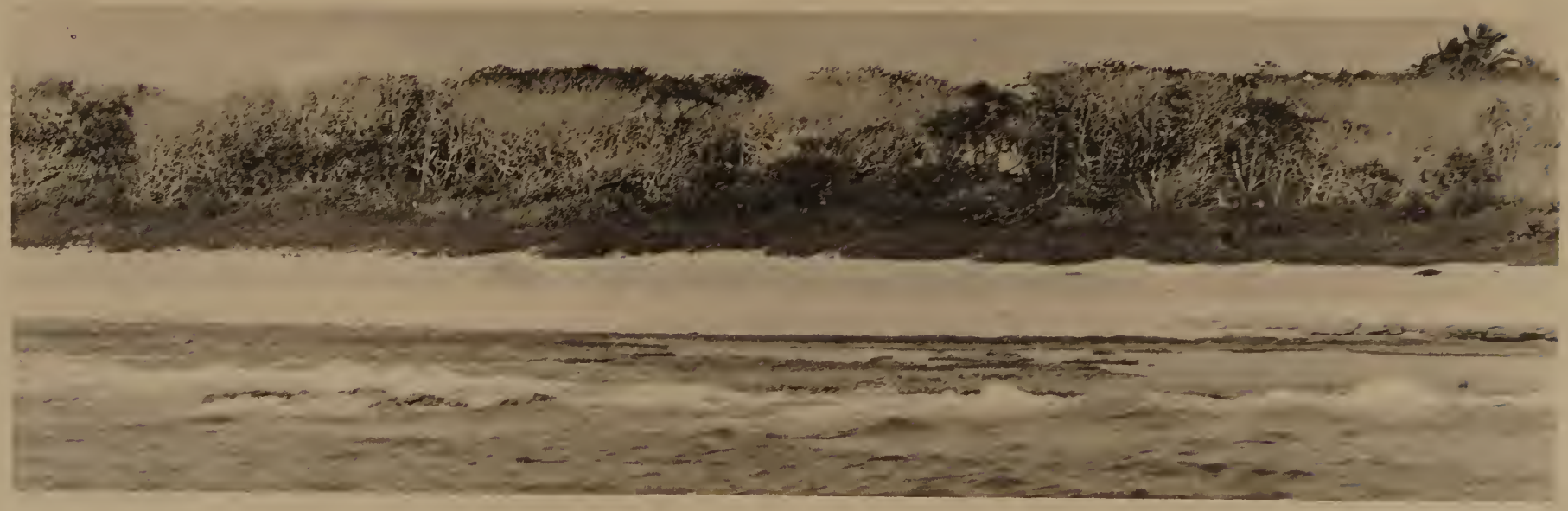
HEREHERETUE.

1. High sand beach, flanked by narrow reef flat platform, encroaching on the vegetation of the land rim on the northeast face of the atoll, seen from the sea.

2. Looking across the narrow reef flat towards the high coral sand beach. The upper part of the beach is covered by low bushes, and the summit by trees that have been killed by sand dunes.

1, 2, W. McM. W., Phot.

1



2

HELIOTYPE CO., BOSTON.

PLATE 82.

Plate 82.

HEREHERETUE.

1. Lagoon beach of the atoll.

2. Wide outer reef flat platform of the east face of the atoll, seen from the base of the outer coral sand and shingle beach.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 83.

Plate 83.

HEREIIERETUE.

1. Long sand spit and belt of islets running north, in the interior of the lagoon, from the lagoon face of the land rim of the eastern face of the atoll.

2. Long sand spit, parallel with the outer face of the atoll, separating a shallow secondary lagoon from the main lagoon.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 84.

Plate 84.

TAHITI.

1. Looking out over the barrier reef of the east side of Papieté Harbor, Point Fareute on the right. W. McM. W., Phot.

2. Entrance of Papieté Harbor, Murea in the distance, Motu-uta on the right.

A. G. M., Phot.

3. Horn of the barrier reef on the west side of the entrance to Papieté Harbor, seen entering the harbor.

4. Horn of the barrier reef on the east side of the entrance to Papieté Harbor, seen entering the harbor.

3, 4, W., McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 85.

Plate 85.

TAHITI.

1. Line of barrier reefs off the volcanic slopes of the east shore of Tahiti, off Bougainville Harbor and Boudeuse Pass.

2. Papieté, seen from our anchorage, with the volcanic slopes rising in the rear, "Reine" Valley in the centre.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 86.

Plate 86.

TAHITI.

1. Barrier reef off the northeast slope, connecting Motu Puuru and Nansouty Island.

2. Barrier reef off the east coast of the island, south of the Popeiha River (Hitiaa).

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 87.

Plate 87.

TAHITI.

1. Termination of the barrier reef off Puaiti opposite Utuofai River, on the east coast of the island.
2. Looking towards Papieté on the road to Point Venus, entrance to barrier reef south of Matavai Bay.
3. Taravao Bay, looking south, on the east face of Taiarapu Peninsula towards Motu Nono.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 88.

Plate 88.

TAHITI.

1. Looking from the beach on the west face of Point Venus towards Mount Diadème in the central part of the island. W. McM. W., Phot.

2. Volcanic sand beach and cliffs at Papenu Point, north shore of the island.

1

HELIOTYPE CO., BOSTON.

2

PLATE 89.

Plate 89.

TAHITI.

1. Looking towards the centre of the island, Mount Diadème in the background.
W. McM. W., Phot.

2. Papieté from our anchorage, Fautaua Valley, with Mount Aorai in the rear.
A. G. M., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 90.

Plate 90.

1. Junction of lakes Temae and Motuiti, northeast point of Murea.
2. Mehetia, extinct volcano, seen from the north. A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 91.

PLATE 91.

MUREA.

1. Entrance to Paopao Bay, north side of the island.
2. The northeastern extremity of the island off Faaupo Point, showing the barrier reef enclosing lake Temae.

1

2

HELIOTYPE CO., BOSTON.

PLATE 92.

Plate 92.

HUAHEINE.

1. Looking into Tiare Pass from the sea. W. McM. W., Phot.
2. Entrance to Tiare Pass, seen from the south. A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 93.

Plate 93.

TAHAA AND RAIATEA.

1. Gap between Tahaa and Raiatea.
2. Gap in the barrier reef, flanked with islets; off Fatira Bay on the north shore of Tahaa.
3. Looking into Teavarua Pass, Raiatea.

1, 2, W. McM W.; 3, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 94.

Plate 94.

TAHAA.

1. Islets on the barrier reef of the northern face of the island, Bora Bora in the distance.
2. Looking southeast, through a gap in the barrier reef and islets on the northern face of the island.
3. Islet on the barrier reef of the horn of the northern end of the island.
4. The eastern face of Motu Oavarei, a wide island flanking the northern part of the east face of Huaheine.

1, 2, W. McM. W.; 3, 4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 95.

Plate 95.

1. Showing the steep slope of Mehetia with small coral sand beach of the island.

H. C. F., Phot.

2. Tetiaroa seen from the southeast.

3. Looking through a gap into the lagoon of Tetiaroa from the east.

2, 3, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 96.

Plate 96.

1. Looking into the lagoon of Tetiaroa from the southeast. W. McM. W., Phot.

2. Looking across a gap in the barrier reef and islets of the northeast point of Tahaa.

3. Central mass of Bora Bora, seen from the north across the islets of the barrier reef.

2, 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON

PLATE 97.

Plate 97.

BORA BORA.

1. The island as seen approaching from the southeast, distant four miles.

2. The island seen from the northwest, looking across the islets and gaps of the barrier reef off the Manini Islands, northwest face of Bora Bora.

3. The island seen from the southeast, looking across the low part of the barrier reef off Taurere Point.

1, 2, W. McM. W.; 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 98.

Plate 98.

BORA BORA.

1. Southeast face of the island, showing the barrier reef to the south, with Motu Piti Aau on the southeastern part of the barrier reef.

2. Gap in the islets and barrier reef of the southeast face of the island, off Motu Apomeo.

3. Looking into the lagoon of the barrier reef through a gap in Motu Piti Aau, southeast face of the island.

1–3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 99.

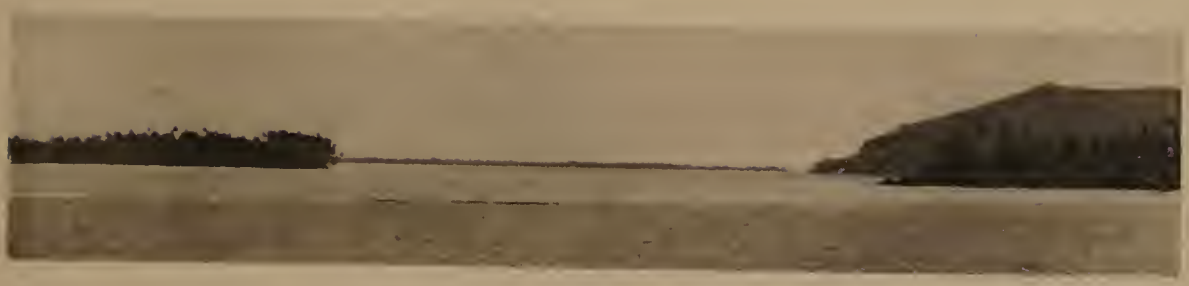
Plate 99.

BORA BORA.

1. Southern extremity of the island seen from the northeast.
2. Looking into the lagoon through a gap on the southeast face of the island.
3. Looking into the lagoon across the barrier reef, on the northwest face of the island.
4. Looking west towards the central peaks of the island, over the islands on the barrier reef.

1, 2, W. McM. W.; 3, 4, A. G. M., Phot.

1



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HELIOTYPE CO., BOSTON.

4

PLATE 100.

Plate 100.

BORA BORA.

1. Central mass of the island, seen from the east, over the islands of the barrier reef, off Motu Itae.

2. Central mass of the island, seen from the northwest, over the islands of the barrier reef, off Motu Ome.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **101**.

Plate 101.

BORA BORA.

1. Central mass of the island seen from the northwest, off Manini Islands.
W. McM. W., Phot.

2. Bora Bora seen from the west, looking into the entrance into the barrier reef lagoon; on the right Motu Tapu and Motu Ahuna, and on the left Teveiroa. A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **102.**

Plate 102.

BORA BORA.

1. Northern extremity of Tupua Island seen from our anchorage off Vaitape, Motu Tapu on the right.

2. Southern extremity of Tupua Island seen from our anchorage.

3. Looking across the gap between Pahua Point and Motu Ahuna towards Teveiroa Island and the Manini Islands.

4. Looking across the gap between Pahua Point and Teveiroa Island.

1, 3, W. McM. W.; 2, 4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 103.

PLATE **103**.

The central mass of Bora Bora, Mounts Pahia and Temanu seen from our anchorage off Vaitape. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 104.

Plate 104.

1. Looking into the lagoon of Motu Iti across the southern reef flat.
2. Looking into the lagoon of Motu Iti over the reef flat of the western face of the atoll.
3. Maupiti, seen from the east.
4. Maupiti, seen from the southeast, off Farepaia, looking over the barrier reef south of Tuanaé Island, towards its northern face.

1, 2, 4, A. G. M.; 3, W. McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 105.

Plate 105.

MAUPITI.

1. Central peak seen from the east, looking over Tuanaé Island.

2. The central mass seen from the east, looking over the barrier reef flats between Farepaia and Té Apaa Island.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

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AT

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PLATES.

II.

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CONTENTS.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE TROPICAL PACIFIC, in charge of ALEXANDER AGASSIZ, by the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander JEFFERSON F. MOSER, U. S. N., Commanding. IV. THE CORAL REEFS OF THE TROPICAL PACIFIC. By ALEXANDER AGASSIZ. pp. xxxiii., 410. 238 Plates. February, 1903.

ONE VOLUME TEXT. THREE VOLUMES PLATES.

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IV.

THE CORAL REEFS
OF THE
TROPICAL PACIFIC.

By ALEXANDER AGASSIZ.

II. — PLATES 106 TO 199.

NIUE TO LADRONES.

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CAMBRIDGE, U. S. A.:
Printed for the Museum.
February, 1903.

PLATE 106.

Plate 106.

1. Aitutaki seen from the northeast, looking over the barrier reef.
2. Terraces on the west shore of Niue, north of Avatele.
3. Bare, pitted and honeycombed terraces on the southwest point of Niue.

1, 2, W. McM. W.; 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 107.

Plate 107.

NIUE.

1. Terraces on the southwest face of the island.

2. Buttresses of elevated coralliferous limestone, near Alofi landing.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 108.

Plate 108.

NIUE.

1. Buttresses on the west face of the island, north of Alofi landing.

2. Buttresses on the west face of the island, looking south of Alofi landing.

1, 2, W. McM. W., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 109.

Plate 109.

Buttresses of elevated coralliferous limestone on the west face of Niue, near Alofi landing.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 110.

Plate 110.

Undercut and elevated coralliferous limestone cliffs on the west face of Niue, riddled with caverns and partly covered by stalactites, near Alofi landing. W. McM. W., Phot.

HELIOTYPE CO., BOSTON.

PLATE **111**.

Plate 111.

EUA.

1. Indistinct terraces on the west side of the island, south of Ohonua. A. G. M., Phot.
2. East face of the island looking south from near the north point.
3. Cliffs of elevated coralliferous limestone on the north point of the island seen from the east.

2, 3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE **112**.

Plate 112.

EUA.

1. Cliffs and terraces on the east face of the island, near the north point.

2. Cliffs and terraces with lines of caverns and stalactites, on the east face of the island, about three miles south of the north point. Five terraces can be distinguished.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 113.

Plate 113.

EUA.

1. Undercut cliffs with lines of caverns and terraces, near the central and highest part of the east face of the island.

2. Elevated coralliferous limestone cliffs on the east face of the island. Fig. 2 follows Fig. 1, south.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **114.**

Plate 114.

EUA.

1. Looking from the summit of the western ridge of the island towards the gap near the landing place on the west side, across the central valley to the northern part of the eastern ridge.

2. Looking eastward, from the third terrace on the western ridge, across the central valley towards the southern part of the eastern ridge; peaks of the fifth or sixth terrace on the right.

3. From the same point as Fig. 2, looking east, across the central valley, towards the middle of the eastern ridge.

1-3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE **115**.

Plate 115.

TONGATÁBU.

1. Entering the harbor of Nukualofa, looking south into the gap between Nukuleka and Holevai.

2. Fanga Kakau, shallow lagoon south of Nukualofa.

3. Looking east from the landing at Nukualofa, towards Pangaimotu, Makahaa, Velitoa, and Fafa. Natives fishing on the flats.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 116.

Plate 116.

TONGATÁBU.

1. Lagoon shore to the east of Nukualofa.
2. Elevated limestone cliffs on the southwest face of the island.

1, 2, Martin, Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 117.

Plate 117.

TONGATÁBU.

1. Blow holes on the outer edge of the reef flat platform at Houma Toloa, south point of the island (Cook's Point).

2. Undercut cliffs of elevated coralliferous limestone with lines of caverns and stalactites, on the Liku, or windward face of the island.

1, 2, Martin, Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE **118**.

Plate 118.

1. Blow hole at Houma Toloa, Tongatábu. Martin, Phot.

HELIOTYPE CO., BOSTON

PLATE **119.**

Plate 119.

NOMUKA.

1. Looking southwest from the base of Mata Kalai across the lagoon of the island, Nomuka Iki in the distance.

2. From the same point, looking across the widest part of the lagoon of the island towards Motu Tafisi and Motu Loto.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 120.

Plate 120.

VAVAU.

1. Looking northeast into the passage leading to the harbor of Neiafu, from off Fata Point.

2. Limestone bluffs to the south of Muitoulo Point on the west shore of Vavau, Houmafakalele Point in the distance, seen from the west. W. McM. W., Phot.

3. Looking east across Neiafu Neck towards the islands on the east face of Vavau.

1, 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON

PLATE **121**.

Plate 121.

VAVAU.

1. The west face of Hunga Island seen from the north, off the entrance to Vavau (Faihava).

2. Elevated coralliferous limestone cliffs and terraces to the east of Fata Point.

3. Neiafu Harbor, Talau and Moungalafa terraces seen from Holobeka

1, 2, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 122.

Plate 122.

1. Off the Talau, looking southeast towards Moungalafa (Vavau).
2. A corner of Vavau Harbor seen from the Talau. Martin, Phot.
3. Vegetation along the road on the summit of the third terrace, western ridge of Eua.

1, 3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 123.

PLATE 123.

VAVAU.

1. Ahanga Passage, looking east.

2. Opening of Ahanga Passage into Neiafu Harbor.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **124**.

Plate 124.

VAVAU.

1. Elevated coralliferous limestone cliffs on the north side of Vavau. Martin, Phot.

2. Looking down upon the cliffs at Matakinina Point, seen from the east.

W. McM. W., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 125.

PLATE **125**.

Limestone bluffs on the north side of Vavau. Martin, Phot.

HELIOTYPE CO., BOSTON.

PLATE 126.

Plate 126.

KAMBARA.

1. Inner slope of the rim of the sink on the southwestern face of the island. The slope in the foreground is composed of volcanic rocks; the rim in the background is made up of elevated limestone.

2. Looking east across the sink of the island, from the summit of the volcanic hill on the west side of the island.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **127**.

Plate 127.

KAMBARA.

1. Looking northeast across the sink of the island, from the summit of the volcanic hill on the west face. Wangava in the distance.

2. Gap on the west face of the island, at the junction of the volcanic hill and of the elevated coralliferous limestone rim of the island. Wangava in the distance.

1, 2, W. McM. W., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 128.

Plate 128.

1. A bend in the Rewa, southern face of Viti Levu.
2. Ba River, northern face of Viti Levu.
3. Volcanic islet, an outlier on the reef flat platform of the northern face of Rotumah.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 129.

Plate 129.

1. South end of Nurakita (Ellice Islands), looking west.
2. Nukufetau seen approaching it from the south.
3. Looking across the east face of the northern part of Nukufetau atoll.
4. The Motungie Islands at the southern extremity of the atoll of Funafuti.

1, 3, A. G. M.; 2, 4, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 130.

Plate 130.

FUNAFUTI.

1. Gap on the east face of the atoll between Telele and Funafara; the islands of Tutanga and Falaoingo in the rear.
2. Gap on the east face of the atoll between Funafara and Lua Motu. In the distance is seen Tefala Island.
3. Gap on the east face of the atoll between the north end of Lua Motu and Mateika.
4. Northern extremity of Funamanu islet, on the east face of the atoll.

1, 2, W. McM. W.; 3, 4, A. G. M., Phot.

1

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3

HELIOTYPE CO., BOSTON.

4

PLATE **131**.

Plate 131.

FUNAFUTI.

1. South end of Funafuti Island, with submerged reef to the south of Matafuana.
2. Northeast face of the atoll, showing Amatuku and Mulitefala Islands.
3. Gap between Amatuku and Mulitefala south of the northern entrance to the atoll; the island of Tebuka is seen in the distance through the gap, and to the right Fualifeke.
4. Te Afualiku, sand key north of the entrance, seen when approaching the southern horn of the north passage.

1, 2, A. G. M.; 3, 4, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 132.

Plate 132.

FUNAFUTI.

1. Lagoon beach at Fongafale seen from the anchorage.

2. Sea face of the island north of the boring station north of Fongafale village.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 133.

Plate 133.

FUNAFUTI.

1. Elevated recent reef rock conglomerate on the lagoon side of the northern part of Amatuku.
2. Gap between Funafuti and Tengako covered with rubble and coarse shingle, Tebuka Island in the distance.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 134.

Plate 134.

FUNAFUTI.

1. Northern extremity of Amatuku, looking towards Mulitefala. W. McM. W., Phot

2. Looking north from the northern extremity of Amatuku towards the northern end of Mulitefala. A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 135.

Plate 135.

FUNAFUTI.

1. Sea face, northern end of Tengako, looking north, Amatuku in the distance.

2. Eroded sea face platform, eroded elevated beach rock, and reef rock outliers at the north end of Funafuti Island.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 136.

Plate 136.

FUNAFUTI.

1. Sea face on the northern part of Tengako, with elevated reef rock outliers.

2. Looking towards Amatuku on the sea face of the north point of Tengako. Reef flat platform covered with beach rock and reef rock slabs and boulders.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 137.

Plate 137.

FUNAFUTI.

1. Southern part of Taiisale, the secondary lagoon to the east of Fongafale village.
2. Northern part of Taiisale.
3. Northern part of Taiisale near the Borehole.

1-3, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 138.

Plate 138.

TAPETEUEA.

1. Narrow island on the east face of the atoll, towards the northern part.
2. Islands, islets, and bars south of the central part on the east face of the atoll.
3. East face of the long island near the north end of the atoll.
4. Islands on the east face of the northeastern part of Apamama.

1–4, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON

4

PLATE 139.

Plate 139.

APAMAMA.

1. Gap between two islands on the east face of the atoll.
2. Bay in the large island on the east face of the atoll.
3. Sea face of island on the south side of the atoll.
4. Reef flat platform lagoon on the east face about two miles from the southern point of Maiana.

1–4, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE **140**.

Plate 140.

1. Narrow part of land rim of Maiana near the point of the eastern horn of the atoll.

TARAWA.

2. Islands and islets on the east face of the atoll.
3. Looking from the sea into gap between islands on the east face of the atoll.
4. Looking from the sea into gap and bay between islands on the south face of the atoll.

1–4, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 141.

Plate 141.

TARAWA.

1. Sea face of island on the south side of the atoll.
2. Islands, islets, and bars on the south face of the atoll.
3. Islands, islets, bars and secondary lagoon on the reef flat on the south side of the atoll.
4. A similar view with islands of the east face of the atoll in the distance.

1, 2, A. G. M.; 3, 4, W. McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON

PLATE **142**.

PLATE **142**.

TARAWA.

1. Lagoon shore and flat, looking south.

2 Lagoon side of islands and flat in rear of village.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 143.

PLATE 143.

TARAWA.

1. Looking west along the lagoon shore, over the flat.

2. Sink in the lagoon, near the village.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **144**.

Plate 144.

TARAWA.

1. Sink in the lagoon, looking towards the village.

2. Lagoon side of the atoll, looking north along the sink.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **145**.

Plate 145.

1. Looking into the lagoon across the gap north of the small island, at the north point of Apaiang.
2. Southeast horn of Apaiang seen from the south.
3. Sea face of island on the south face of Apaiang.
4. Sink in the lagoon of Tarawa, near the village, looking north.

1–3, W. McM. W.; 4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 146.

Plate 146.

MARAKI.

1. Entrance into the lagoon, west face of the atoll.
2. South point of the atoll, looking northeast.
3. High sand beach and wide reef flat, on the north point of the west face of the atoll.

1–3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE **147**.

Plate 147.

MARAKI.

1. Steep sand and shingle beach and wide steep reef flat, on the west face of the atoll near trader's house, north of entrance to the atoll.

2. Steep shingle and boulder beach north of Fig. 1, reef flat very narrow.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE **148**.

Plate 148.

MARAKI.

1. Looking into the lagoon over the narrow land rim on the south face of the atoll, high sand beach and narrow reef flat; land rim of the east face seen in the distance.

2. Another view of the same land rim, somewhat more to the westward; land rim of the east face seen in the distance.

1, 2, W. McM. W., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 149.

Plate 149.

MARAKI.

1. Looking through a gap across the lagoon over the narrow land rim of the southern face of the atoll, the eastern land rim seen in the distance; the secondary land rim in the middle ground. W. McM. W., Phot.

2. Secondary land rim on the outer edge of the lagoon flat and secondary lagoon; a second line of islands will form the third land rim; the east face of the atoll seen in the distance. A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 150.

Plate 150.

MARAKI.

1. Looking over the low land rim on the southwest horn of the atoll, across the lagoon towards the land rim of the east face. W. McM. W., Phot.

2. Bars and secondary land rim, with lagoon flat, looking north along the lagoon face of the western land rim. A. G. M., Phot.

1

HELIOTYPE CO., BOSTON.

2

PLATE 151.

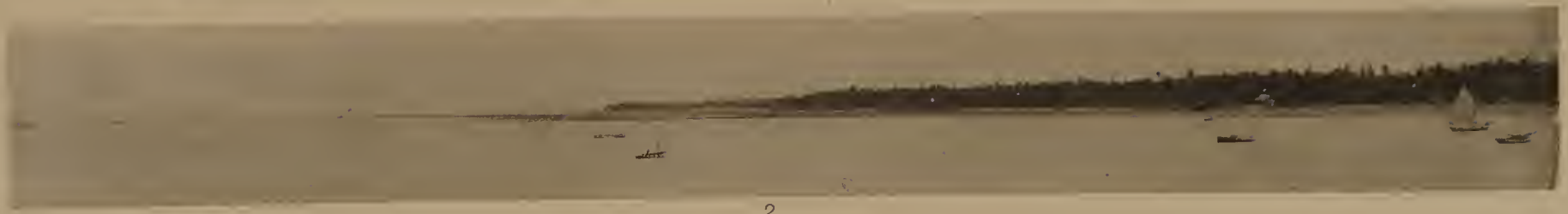
Plate 151.

TARITARI.

1. Flat to the west of Butaritari, looking towards Passage Point.
2. Flat to the east of Butaritari, looking northeast.
3. Sand flats off Butaritari, between the anchorage and the shore.
4. Eastern horn of Taritari, south of the gap between the villages of Keuea and Tanimaiaki.

1, 2, W. McM. W.; 3, 4, A. G. M., Phot.

1



2

3

HELIOTYPE CO., BOSTON.

4

PLATE 152.

Plate 152.

TARITARI.

1. Looking north through the gap (Pl. 151, fig. 4), in the centre of the southeast face of the atoll.

2. Islet in the same gap (Keuea gap), showing lines of beach rock boulders and slabs, running at right angles to the sea face.

3. Bay on the sea face of the land rim to the west of Tanimaiaki village.

4. Looking through a narrow gap on the sea face of the land rim of Butaritari Island about one mile west of Tanimaiaki village.

1, 2, 4, W. McM. W.; 3, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 153.

Plate 153.

TARITARI.

1. Islands and islets on the flats of Keuea gap, covered with cocoanut trees, flanked by beach rock boulder beaches, seen from the sea face.

2. Other islands in the same gap, seen from the sea face, looking towards Butaritari.

3. Islets with beach rock and shingle bars, adjoining the point south of Keuea village.

1-3, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE **154**.

Plate 154.

TARITARI.

1. Entrance islet on the south face of the southwestern passage.
2. Sea face of point of Butaritari Island, north of Ukiañ̃añ̃ village.
3. Sea face of the western Pikhat Island, on the northwestern horn of the atoll, showing the passage between it and eastern Pikhat Island.
4. Steep boulder beach on the sea face of Butaritari Island, north of Ukiañ̃añ̃ village.

1, 3, W. McM. W.; 2, 4, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 155.

Plate 155.

TARITARI.

1. Sea face of the land rim between the villages of Kuma and Keuea.
2. The village of Keuea seen from the lagoon flat, showing the vegetation of the western face of the land rim.
3. Wide Millepore lagoon flat off Keuea village, looking in a northwesterly direction.

1–3, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 156.

Plate 156.

TARITARI.

1. On the point south of Keuea village, near the sea face; looking across the gap towards Butaritari.

2. On the lagoon beach south of Keuea village, looking across the lagoon opening of Keuea gap towards Tanimaiaki village.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 157.

Plate 157.

TARITARI.

1. Eastern edge of the lagoon flat on the north side of Keuea gap.

2. Shingle and sand islet on the sea face of a bay east of Keuea village.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 158.

Plate 158.

TARITARI.

1. Secondary reef flat platform lagoon formed on the sea face of Keuea gap between the flats extending across the gap and the sea wall, coral boulder and beach rock slabs dam extending from the northern side of the gap to the eastern horn of the atoll, east of Tanimaiaki village.

2. Sea wall (see Fig. 1), separating the secondary reef flat platform lagoon and the sea face of the gap, seen looking south, the lagoon face on the right, the sea face on the left.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 159.

Plate 159.

TARITARI.

1. Lagoon beach and flat to the west of Butaritari.

2. Flats on the marshy land west of Butaritari, with bars covered by cocoanut trees and scrub vegetation, on the way from Butaritari to Ukiáññañ village, looking north.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 160.

Plate 160.

TARITARI.

1. Bar covered with cocoanut trees, in partly submerged flat, on the western land rim of Butaritari Island on the way to Ukiañ̃añ̃.

2. Sink to the west of Butaritari, on the way to Ukiañ̃añ̃.

1

2

HELIOTYPE CO., BOSTON.

PLATE 160 *a*.

Plate 160 *a*.

1. Principal canoe passage, Tapriva (Ocean Island), Baanapa; elevated coralliferous limestone buttresses.

2. Lagoon, flanked by pitted and honeycombed pinnacles of elevated coralliferous limestone, at northeast end of (Pleasant Island) Nauru.

3. Buttresses of elevated coralliferous limestone, Tapriva (Ocean Island), Baanapa.

1–3 from Photographs by Mr. John Arundel.

1

2

3

PLATE 160 *b*.

Plate 160 *b*.

(PLEASANT ISLAND) NAURU.

1. Lagoon, flanked with pitted and honeycombed pinnacles of elevated coralliferous limestone, near the northeast extremity of the island.

2. Sink and surrounding vegetation near Ohlson's station.

1, 2 from Photographs by Mr. John Arundel.

1

2

PLATE 161.

Plate 161.

JALUIT.

1. Looking across from our anchorage, over the narrow land rim to the south of Jabor.
2. Southeastern passage into the atoll, seen from the sea face.
3. Islands and islets on the land rim to the north of the southeast pass, looking north.
4. Islands on the north side of the southeast pass, looking north across the lagoon sid of the pass.

1–4, W. McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 162.

Plate 162.

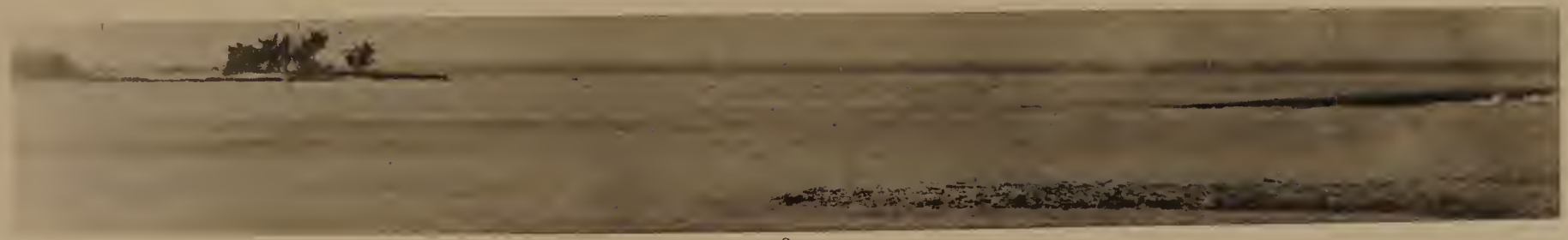
JALUIT.

1. Beach rock bars on the lagoon face of the atoll, about two miles south of Jabor.
2. Looking across the northeast pass, along the west coast of Imrodj.
3. Beach rock bars and islets on the lagoon face of the atoll, south of the village of Jabor.
4. Beach rock flats and bars on the lagoon face south of Jabor.

1, 2, W. McM. W.; 3, 4, A. G. M., Phot.

1

2



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HELIOTYPE CO., BOSTON.

4

PLATE 163.

Plate 163.

JALUIT.

1. Looking into the southwest pass, between Ai and Medjerrurik, seen from the sea.
2. Looking out of the southwest pass from the lagoon side.
3. Gap between Medjerrurik and Menga, seen off the southwest face of the atoll.
4. Flats in the lagoon near the southwest pass of the atoll.

1, 2, 4, W. McM. W.; 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 164.

Plate 164.

JALUIT.

1. Looking across the southeast pass, from the sea face of the beach, east of Jabor, the reef flat covered by the tide, but still showing the outer edge of Nullipore knolls.

2. Reef flat and beach rock bars, on the outer edge of the reef flat platform east of the village of Jabor.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 165.

Plate 165.

JALUIT.

1. Sea face of land rim east of Jabor, showing high coarse shingle beach, conglomerate and breccia outliers and reef flat platform, looking south.

2. Pot-holes on the reef flat platform, of the same part of the land rim as Fig. 1, seen looking north.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 166.

Plate 166.

JALUIT.

1. Sink in the central part of the land rim of Enūbor Island. Mrs. Brandeis' Phot.
2. Sink to the east of the village of Jabor. A. G. M., Phot.

1

HELIOTYPE CO., BOSTON

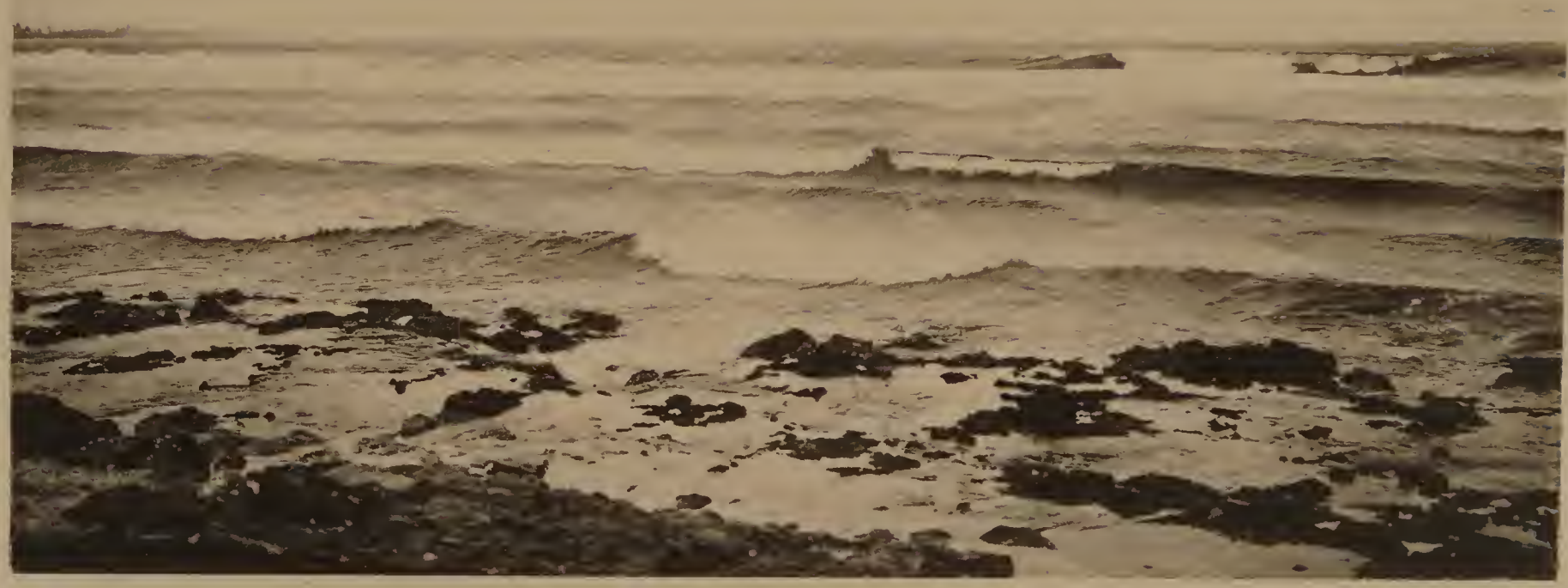
2

PLATE 167.

Plate 167.

1. Southwest point of Nauru, seen from the south.
2. Sea face of Jaluit, south of the southeast pass, at high tide. Hütter, Phot.

1



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HELIOTYPE CO., BOSTON.

PLATE 168.

Plate 168.

AILINGLAP.

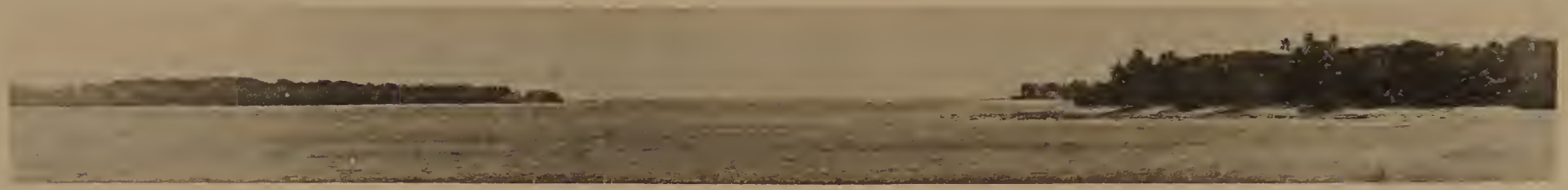
1. South pass, between Bigatjelang Island on the north and Enüebing Island on the south, seen from the sea.

2. Looking northwest along the sea face of the western shore of Bigatjelang Island.

3. Sand and shingle beach along the northern extremity of Bigatjelang Island, seen from the sea.

4. Airek Island, south face of the land rim of the atoll.

1, 2, 4, W. McM. W.; 3, A. G. M., Phot.



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4

HELIOTYPE CO., BOSTON

PLATE 169.

Plate 169.

KWAJALONG.

1. Gehh Island with reef flat to the south, as seen from the west.

2. South face of the atoll, looking northwest from the extremity of Ennülabegan Island.

3. North end of Jlleginni Island, with sand bars from the lagoon or east side of the land rim, blown from the west face over the reef flat platform; a line of breakers indicates a shoal in the lagoon.

4. Island, sand bar, and wide gap on the west face of Kwajalong north of Jlleginni.

1, 2, 4, W. McM. W.; 3, A. G. M.. Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 170.

Plate 170.

KWAJALONG.

1. Island north of Jerr Pass on the west face of the atoll.
2. Southern extremity of Jerr Island with submerged reef flat to the southwest face of the atoll.
3. Wotje Pass, Wotje Island to the south, Ennümet Island to the north, seen from the sea.
4. Submerged reef south of Eru Island, west face of Kwajalong.

1-3, A. G. M.; 4, W. McM. W., Phot.

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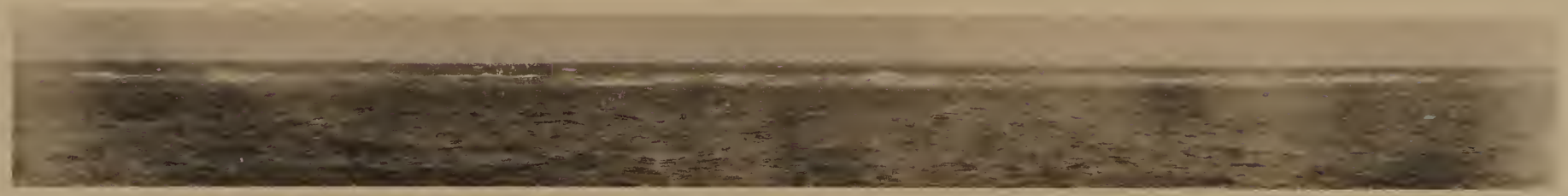

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HELIOTYPE CO., BOSTON.

PLATE **171**.

Plate 171.

1. Coming up to the northwest horn of Ailinglap from the south, showing the wide reef flat and reef flat platform lagoon; Wotja Island in the distance.

2. Reef flat platform, south shore of Rongelappelab Island, looking west, Rongelab.

3. Lagoon shore of Rongelappelab Island, looking west, showing beach rock at base of coarse coral sand beach, Rongelab.

1, 2, W. McM. W.; 3, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON

3

PLATE **172**.

Plate 172.

RONGELAB.

1. Sand beach with beach rock and wide reef flat platform on the south shore of Rongelappelab Island, looking west. W. McM. W., Phot.

2. Sand beach with beach rock on lagoon face of Rongelappelab Island, looking west, with belt of characteristic Marshall Island vegetation on the summit of the beach.

A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 173.

Plate 173.

Vegetation in the central part of Rongelappelab Island, Rongelab, Pandanus, Scævola.

W. McM. W., Phot.

HELIOTYPE CO., BOSTON.

PLATE **174**.

Plate 174.

LIKIEB.

1. West face of Kapenor Island, west face of the atoll.
2. Northern point of island at the southwest horn of the atoll.
3. Looking into the lagoon through gap between islands to the west of the South Pass, seen from the south.
4. Islet and sand bar to the east of the South Pass, seen from the lagoon side.

1-4, W. McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 175.

Plate 175.

LIKIEB.

1. Coral sand and shingle beach flanked with beach rock, on the sea face of the atoll looking north.

2. Beach rock shore on the lagoon face of the atoll, looking east.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 176.

Plate 176.

Small coral heads and boulders among the bushes and in the vegetation to the rear of the beach on the sea face of Likieb. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 177.

PLATE **177.**

Dry sinks formed by the connection of lagoon islets, Likieb. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 178.

PLATE **178**.

Vegetation in the central part of Wotje Island, Wotje, Pandanus, Scævola.

A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 179.

Plate 179.

WOTJE.

1. Looking across the wide gap to the north of Wotje Island, at high tide.

2. Wide gap and lagoon flat, with islet and shingle bars to the north of Wotje Island.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 180.

PLATE 180.

WOTJE.

1. Wide gap between the northern extremity of Wotje Island and the island to the north.
2. Islands and islets to the west of Schischmarev Pass, seen from the sea.

ARHNO.

3. Islands at the base of the northern horn of the atoll, looking west, seen from the sea.
4. Looking across the gap between islands to the west of Dodo Pass, to the islands on the northwest face of the atoll.

1-4, W. McM. W., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE **181**.

Plate 181.

ARHNO.

1. Islet west of Dodo Pass, looking across the lagoon, South Point Island in the distance.

2. Distant view of the eastern land rim of the atoll (Terranova), seen from the lagoon side of Dodo Pass.

3. Looking northeast into the extension of the lagoon into the eastern spit of the atoll, across the western angle of Terranova, showing the line of islands on the north face of the eastern extension of the lagoon, seen from our anchorage.

4. Islands on the north face of the lagoon extension into the eastern spit, seen from our anchorage in the lagoon, off Terranova.

1, 2, 4, W. McM. W.; 3, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 182.

Plate 182.

ARHNO.

1. West face of the northwest point seen from the west, the islands of the east face of the horn in the background.

2. West face of the horn, looking across the west flats to the single row of islands nearer the east face of the atoll.

3. Ledge on the eastern side of the entrance to Port Lottin, Kusaie.

4. Islands on a part of the south face of the atoll of Andema, seen from the southeast; Kahalape Island to the right, Paguaiganigue to the left.

1, 2, 4, W. McM. W.; 3, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 183.

PLATE 183.

1. South point of Pachiai Island, Andema, seen from the south.

PINGELAP.

2. Southern part of the west face of Pingelap Island.

3. Looking into the lagoon of the atoll from the west across to the gap between Pingelap Island (to the right) and Tugulu Island (to the left) on the northeast face of the atoll.

4. Village on the west face of Pingelap Island.

1–4, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

4

PLATE 184.

Plate 184.

KUSAIE.

1. Vegetation on the lagoon side of the barrier reef near Point Lesson to the west of Port Lottin.

2. Vegetation on the east shore of the barrier reef on the west side of Port Lottin at the northern extremity of the harbor.

3. Looking northeast from Cape Vauvilliers along the northwest face of Kusaie, Gabert Island in the distance.

1, 2, A. G. M.; 3, W. McM. W., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 185.

Plate 185.

KUSAIE.

1. Fringe of mangroves along the south face of the island to the east of Port Lottin.
2. Fringe of mangroves along the south face of the island, looking north from our anchorage.
3. Looking west from the entrance to the lagoon channel running south along the base of the island, east of Port Lottin.

1–3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 186.

Plate 186.

KUSAIE.

Vegetation along the sides of the lagoon channel of the south face of the island, looking east. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 187.

Plate 187.

KUSAIE.

Boulder of recent reef rock on the reef flat east of Lottin Harbor (about eighteen feet by twelve feet). A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE 188.

Plate 188.

PONAPI.

1. Looking north across the mouth of Port Métalanim, Nar Island on the right.
2. Looking into Port Métalanim, across the reef connecting Nar and Narcap Islands.
3. Barrier reef to the south of Métalanim, Nahanur Island in the centre.
4. Barrier reef and flat around Nahanapenlord Island.

1, 2, W. McM. W.; 3, 4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 189.

Plate 189.

PONAPI.

1. Panian Islands, seen from the east.

2. Nahatik islets, on the barrier reef to the east of Kiti Harbor, seen from the south, looking over the wide reef flat separating them from the mangrove fringe which extends along the south face of Ponapi.

3. Mangrove islet at the east horn of the entrance to Kiti Harbor, looking east towards Point Nantiaiti, the Panian Islands in the distance.

4. Looking northeast, over the wide reef flat towards Point Nantiaiti, inside the barrier reef, showing the black belt of mangroves fringing the south face of the island; Lucoila Peak on the left.

1-4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 190.

Plate 190.

PONAPI.

1. Looking east from our anchorage in Kiti Harbor towards Point Nantiaiti, Peak Roie on the left, the Panian Islands in the centre, the eastern horn of Kiti Harbor on the right.

2. Looking northwest from our anchorage in Kiti Harbor, along the west face of Ponapi through the gap between Tulatik Island and the southwest point of the island.

3. East face of Narlap Island from our anchorage in Kiti Harbor.

4. Looking over the extremity of the south island and the south horn of Royalist atoll across to Lauvergne Island.

1, 3, W. McM. W.; 2, 4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 191.

PLATE 191.

TRUK.

1. Looking north past Faleu Island, on the southern barrier reef into the lagoon of Truk; the island of Peridiak in the distance.

2. Islands on the barrier reef of the south face of the atoll, Mesegou to the right, Uijec in the centre, next Udidan, and on the left of Uligar Pass, Fanan Island.

3. The eastern group of islands in the lagoon of Truk; the island of Umol to the right, Ruk in the centre, and Tsis to the left.

4. Uola seen across the northwest point of Ruk, from the south.

1, 3, W. McM. W.; 2, 4, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 192.

Plate 192.

TRUK.

1. Mangrove islets along the southwest face of Uola, near our anchorage.
2. Part of the west face of Uola, seen from our anchorage.

1, 2, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

PLATE 193.

Plate 193.

TRUK.

1. Looking south from our anchorage, Ruk on the right, Umol in the centre, Toloas on the left.

2. Looking from our anchorage towards the western group of islands in the atoll, Udot to the left, with the peaks of Tol towards the right.

3. Looking across the north end of Uola, towards Gregoire Island (on the left).

4. North end of Pis Island, seen going out of the pass, looking across the horn of the barrier reef towards the island to the east of Pis.

1, 3, 4, W. McM. W.; 2, A. G. M., Phot.

1

2

3

4

HELIOTYPE CO., BOSTON.

PLATE 194.

Plate 194.

GUAM.

1. Patay Point, east face of the island from the southeast.
2. Looking north from Punta de los Amantes, towards Point Ritidian, west face of the island.
3. Junction of the volcanic outburst with the elevated coralliferous limestone belt, west face of the island, near Agaña.

1, W. McM. W.; 2, 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 195.

Plate 195.

GUAM.

1. Looking over Luminan barrier reef, on the north face of the harbor of San Luis d'Apra, Cabras Island on the right, Point Ritidian in the distance.

2. Looking south from our anchorage in the harbor of San Luis d'Apra, over Oroté Peninsula, towards the southern volcanic range of Guam.

3. Elevated coralliferous limestone bluffs at the western extremity of Oroté Point, the volcanic bluffs of Point Facpi in the distance.

1, 2, W. McM. W.; 3, A. G. M., Phot.

1

2

3

HELIOTYPE CO., BOSTON.

PLATE 196.

Plate 196.

GUAM.

Eroded elevated coralliferous limestone on the southern face of Cabras Island, with a clump of Cycads. A. G. M., Phot.

HELIOTYPE CO., BOSTON.

PLATE **197**.

Plate 197.

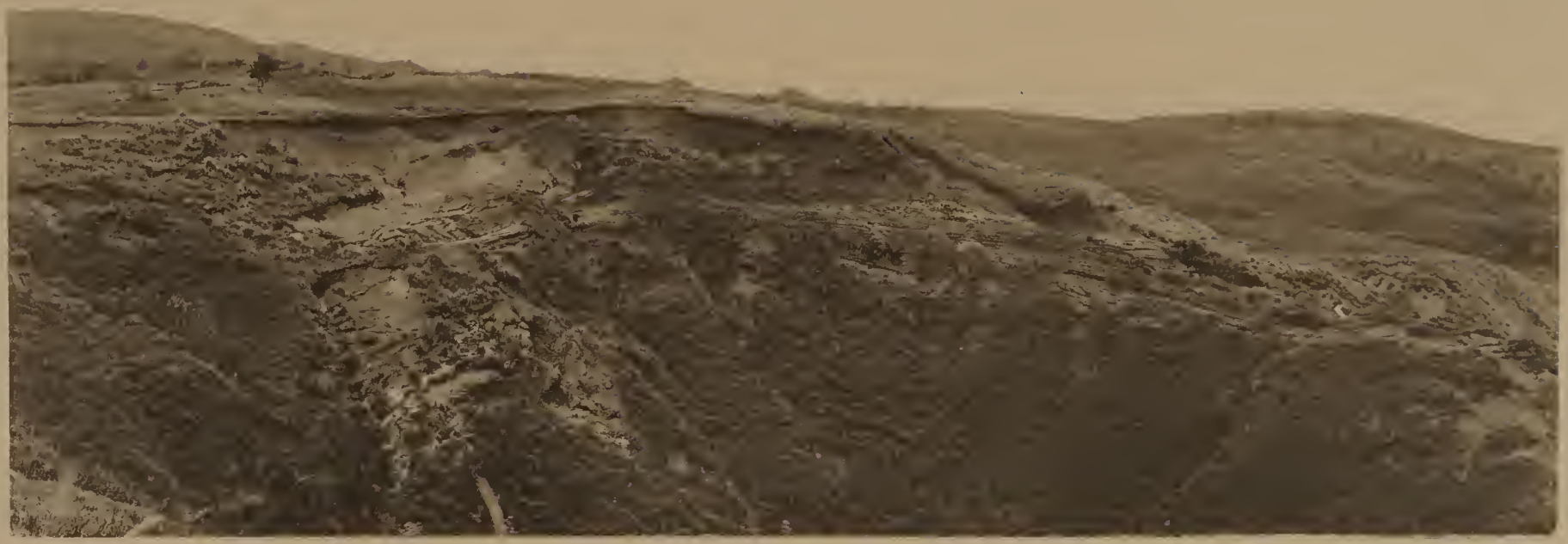
GUAM.

1. Looking over the eastern extension of Oroté Peninsula towards the southern volcanic hills of Guam.

2 Volcanic hills to the east of Agaña.

1, 2, A. G. M., Phot.

1



2

HELIOTYPE CO., BOSTON.

PLATE 198.

Plate 198.

GUAM.

1. Volcanic bluff at Point Facpi; the islet to the right is an outlier of elevated coralliferous limestone, southwest face of Guam.

2. Looking south from Point Facpi, southwest coast of Guam; in the distance sharp volcanic hills, rounded ridge of elevated coralliferous limestone, with blocks and outliers of the same on the shore.

3. Looking over the mesa of Guam towards Mount Santa Rosa from the hill above Agaña.

1–3, A. G. M., Phot.

1

2

HELIOTYPE CO., BOSTON.

3

PLATE 199.

Plate 199.

ROTA.

1. The west face of the island and its terraces, seen from off Point Taipingon.

2. Showing the terraces of the southwest face of the island, looking across Sosanlagh Bay.

1, 2, W. McM. W., Phot.

1

2

HELIOTYPE CO., BOSTON.

MEMOIRS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT

HARVARD COLLEGE.

VOL. XXVIII.

PLATES.

III.

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ONE VOLUME TEXT. THREE VOLUMES PLATES.

Memoirs of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
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REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM AUGUST, 1899, TO MARCH, 1900, COMMANDER JEFFERSON F. MOSER, U. S. N., COMMANDING.

IV.

THE CORAL REEFS

OF THE

TROPICAL PACIFIC.

By ALEXANDER AGASSIZ.

III. — PLATES 200 TO 236.

CHARTS AND TWO COLORED PLATES.

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CAMBRIDGE, U. S. A.:
Printed for the Museum.
February, 1903.

PLATE 200.

PLATE 200.

Track of the "Albatross" through the Marquesas, reduced from Admiralty Chart 1640.

PLATE 201.

PLATE **201**.

Track of the "Albatross" through the Paumotus and Society Islands.

PLATE 202.

PLATE **202.**

The western Paumotus and the Society Islands, from A. Chart 767.

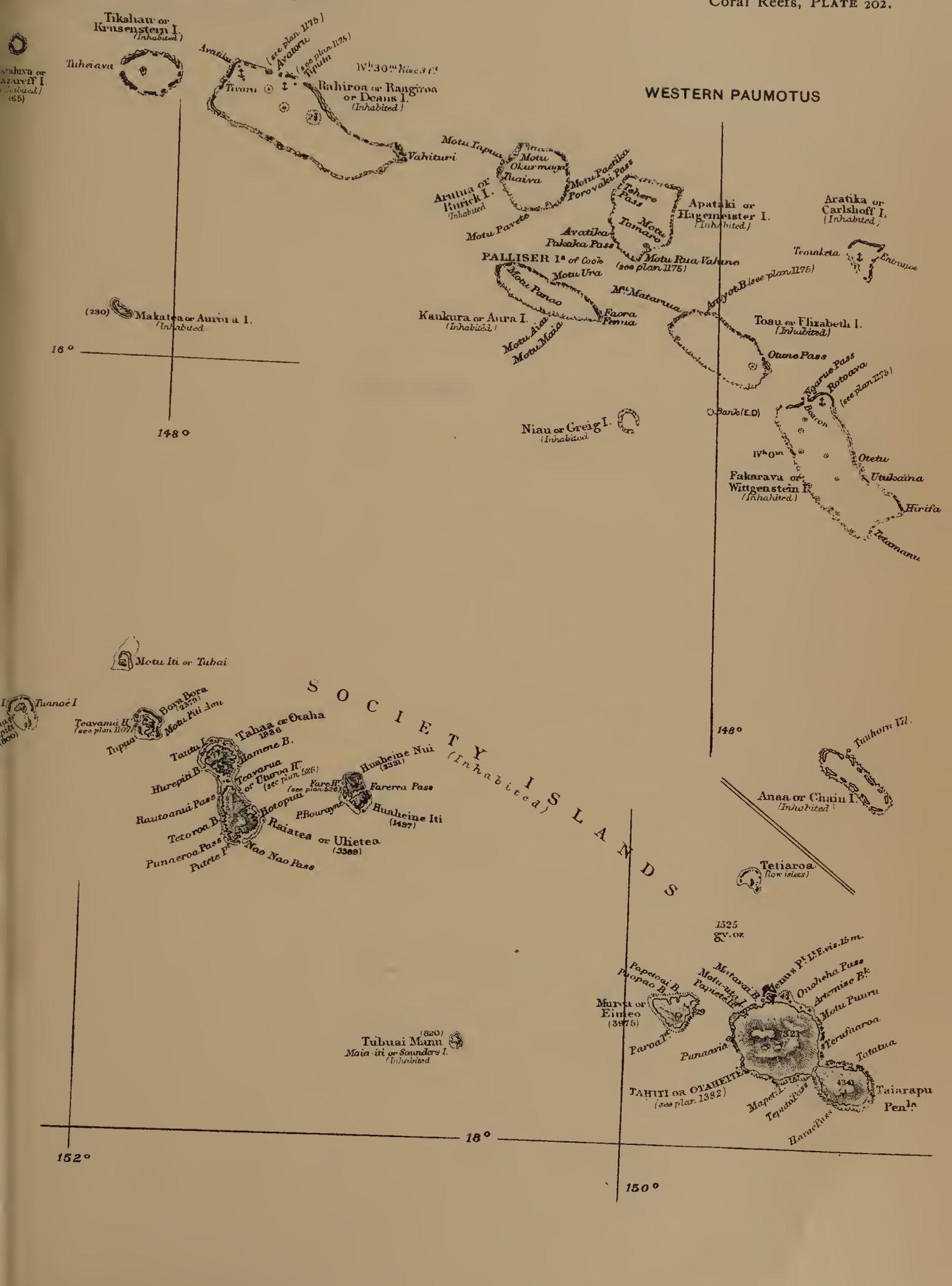

WESTERN PAUMOTUS
SOCIETY ISLANDS (Inhabited)
Tikahau or Krusenstern I. (Inhabited)
Tuheiava
Aratika (see plan 1175)
Avatoru (see plan 1175)
Tipuka
Tiwani
Rahiroa or Rangiroa or Deans I. (Inhabited)
Vahituri
Motu Iapua
Motu Okurmaga
Tuaiva
Motu Paeriko
Porovaki Pass
Arutua or Reriek I. (Inhabited)
Motu Pavete
Tehere Pass
Motu Tamaro
Apataki or Hagemeister I. (Inhabited)
Aratika or Carlshoff I. (Inhabited)
Avatika
Pakaka Pass
PALLISER Is of Cook
Motu Rua Vahine (see plan 1175)
Motu Ura
Motu Panao
Mt Matarua
Arego ot B (see plan 1175)
Temakeia
Entrance
Kaukura or Aura I. (Inhabited)
Faora
Fenua
Motu Aiai
Motu Maia
Toau or Elizabeth I. (Inhabited)
Otune Pass
Ngarue Pass
Rotoava (see plan 1175)
Beacon
Bank (E.D)
Niau or Greig I. (Inhabited)
Otetu
Utukaina
Fakarava or Wittgenstein I. (Inhabited)
Hirifa
Tetamanu
Motu Iti or Tubai
Tuanaé I
Bora Bora 2379
Teavanui H. (see plan 1107)
Motu Piti Aau
Tupua
Tahaa or Oraha 1926
Tautu I.
Hamene B.
Hurepiti B.
Teavarua or Uhuroa H. (see plan 526)
Huahcine Nui (2331)
Vare H. (see plan 526)
Fareria Pass
Rautoanui Pass
Hotopuli
P. Bouryne
Huahcine Iti (1497)
Tetoroa B.
Raiatea or Uhietea (3388)
Punaeroa Pass
Puttle P.
Nao Nao Pass
Tubuai Mann (820)
Maia-iti or Saunders I. (Inhabited)
Tuhoma Vil.
Anaa or Chain I. (Inhabited)
Tetiaroa (low islets)
1525 & v. oz
Papetoai B.
Papao B.
Motu-uta I.
Papieete
Mutavai B.
Venus Pt. LtE. vis. 15 m.
Orohena Pass
Artemise Bk
Motu Puuru
Moorea or Eimeo (3475)
Paroa I.
Punaauia
Terufaaroa
Tatatua
TAHITI or OTAHEITE (see plan 1382)
Mapeti I.
Tepatai Pass
Taiarapu Pen.la
Barrier Pass
152°
18°
150°
148°

PLATE 203.

Plate 203.

The eastern Paumotus as far as Pinaki, including the Duke of Gloucester Islands, from A. Chart 767.

PLATE **204.**

PLATE 204.

THE PAUMOTUS.

1. Fakarava, from A. Chart 767, and corrected by officers of the "Albatross," scale twelve miles to the inch.
2. Fakaina, from a sketch by Captain Garnier, scale three miles to the inch.
3. Tiputa Pass, Rangiroa, from H. O. Chart 75, scale three fourths of a mile to the inch.
4. Rangiroa, Tikahau, and Matahiva, from H. O. Chart 75, and corrections by officers of the "Albatross," scale twenty miles to the inch.
5. Strait between Marokau and Ravahere, from H. O. Chart 79, scale nine miles to the inch.
6. Northeast pass into Makemo, from surveys by officers of the "Albatross," scale one third of a mile to the inch.
7. Northwest face of Fakarava, from A. Chart 1175, scale two miles to the inch.

1
Rotoava
Ngaruae Pass
Otetu
Utukaina
Hirifa
Numerous Islands
FAKARAVA
Telamanu
Fakarava

2
Cocoanuts
Cocoanut Grove
FAKAINA
Village
Cocoanuts
Village
Boat Landing to Village

3
TIPUTA PASS

MATAIVA Ip

TIKAHAU Ip

4
Avatoru Pass
Tiputa Pass
Wooded Islet
Reef
Lagoon
Funuaruu
RANGIROA Ip

6
N.E. PASS MAKEMO
MAROKAU Ip
5
Lagoon
RAVAHERE Ip
MAKEMO Ip
Brackish Sink
Brackish Sink
Rikiriki
Mataragameha
Uparari
Tutaekiore
Bekaeko

7
NORTH PASSAGE TO ROTOAVA
Rotoava
Tapaeroa
Kopoapiroa
Togamaitu i uta
Togamaitu i tai
North Passage
Poniu
LAGOON

PLATE 205.

Plate 205.

1. Makatea, from H. O. Chart 83, scale two miles to the inch.
2. Hao, from A. Chart 1111, scale six miles to the inch.
3. Avatoru Pass, Rangiroa, from H. O. Chart 960, scale two miles to the inch.
4. Takume, from H. O. Chart 83, scale three miles to the inch.

MAKATEA
1
VILLAGE
LAGOON
HAO
2
BRACKISH POND
AVATORU
Motoufara
AVATORU PASS
3
4
VILLAGE
TAKUME

PLATE 206.

Plate 206.

1. Anu-Anurunga, scale one mile to the inch.

2. Anu-Anuraro, scale one mile to the inch.

3. Pinaki, scale one mile to the inch.

4. Nukutipipi, scale one fourth of a mile to the inch.

1, 2, 4, from sketches by H. C. Fassett; 3, from a sketch by C. H. Townsend.

1

ANU-ANURUNGA

2

ANU-ANURARO

3

PINAKI

4

NUKUTIPIPI

PLATE 207.

PLATE 207.

The Gambier Islands, from A. Chart 1112, scale two miles to the inch.

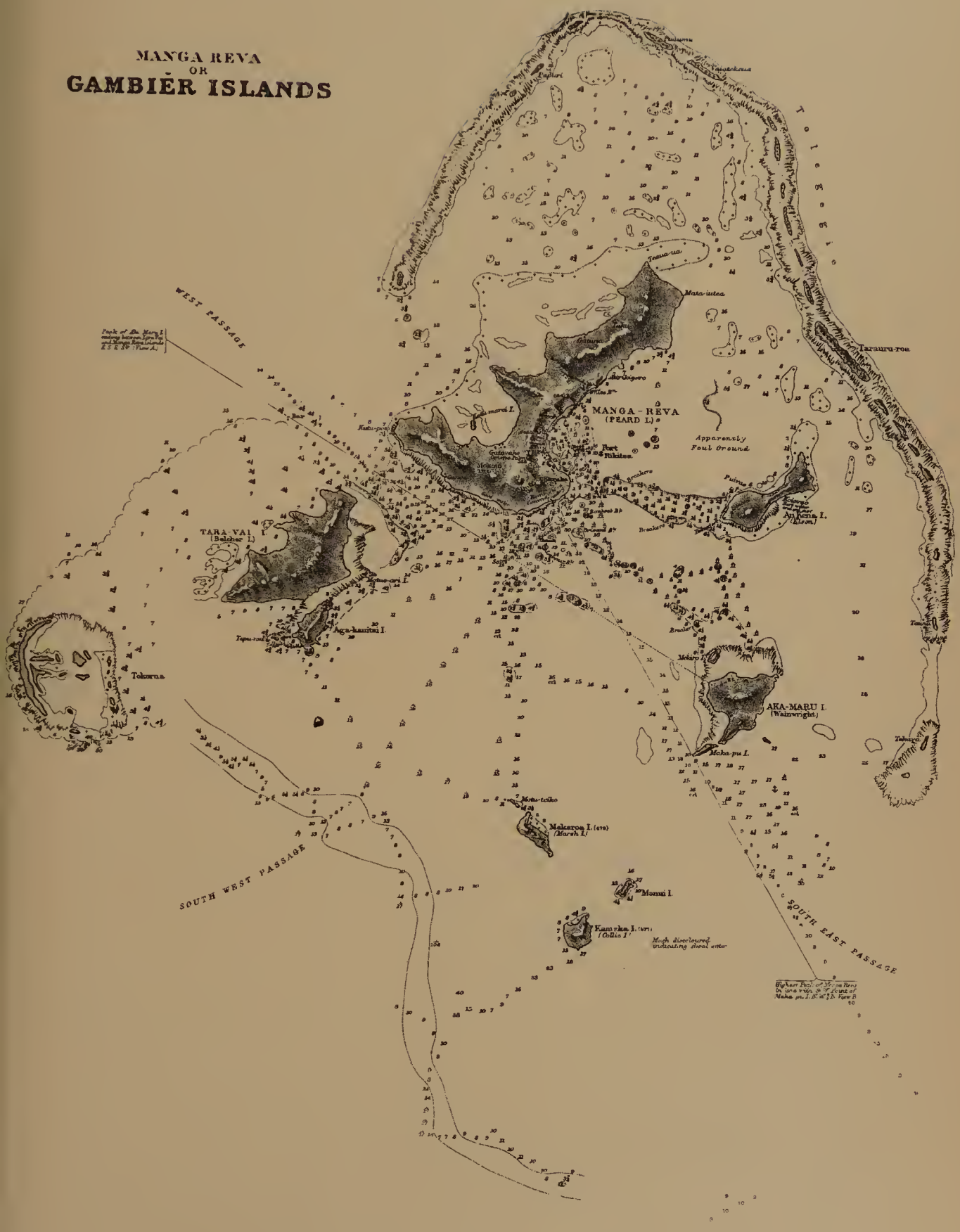

MANGA REVA
OR
GAMBIER ISLANDS
WEST PASSAGE
MANGA-REVA
(PEARD I.)
Mata-iutea
Taraura-roa
Apparently
Foul Ground
Port
Rikitea
TARA-VAI
(Aikener I.)
Aga-kauitai I.
Tokarua
AKA-MARU I.
(Wainwright)
Moka-pu I.
Mokaro
Makaroa I.
(Marsh I.)
Monui I.
Kamaka I.
(Collins I.)
SOUTH WEST PASSAGE
SOUTH EAST PASSAGE
High discoloured
indicating shoal water

PLATE 208.

Plate 208.

1. Taiarapu Peninsula (Tahiti), with its surrounding fringing reefs.
2. Fringing reefs of the east side of Tahiti, from Taravao Bay to Artémise Bank.
3. The fringing and barrier reefs of the south shore of Tahiti, from Popote Bay to the Isthmus of Taravao.
4. The fringing and barrier reefs of the southwest part of Tahiti, from Paea to West Ava-iti.
5. The fringing and barrier reefs from Papieté Pass to north of Acna.
6. Murea, with its fringing and barrier reefs. All figures reduced from A. Chart 1382, scale three miles to the inch.

6
MUREA
Opunohu
Mt Tohivea
Papetoai
Haapiti
Afareaitu
Paopao Valley
Cook or Pao Pao B.
Faaupo Pt
Nuarvi Bay
Vaiare Pass
Tupapauroa Pass
Toromapu Pass
Avamoa Pass
Avaroa Pass
Papeete
Taapuna
Tetamanu
Tetaroa
Tetiaroa
Maiao
Tubuai
Rurutu
Rimatara
Rapa
Raivavae
Rarotonga
Aitutaki
Manuae
Mitiaro
Atiu
Mauke
Takutea
Penrhyn
Manihiki
Rakahanga
Pukapuka
Nassau I.
Suwarrow
Palmerston
Niue
Savage I.
Tongatabu
Eua
Haapai
Vavau
Fiji
Rotuma
Samoa
Tutuila
Manua
Rose I.
Swains
Fakaofo
Nukunono
Atafu
Gilbert Is.
Ellice Is.
Marshall Is.
Ocean I.
Strong's I.
Ascension
Malden I.
Flint I.
Vostok
Caroline I.
Starbuck I.
Hull I.
Sydney I.
Phoenix Is.
Enderbury I.
Hawaiian Is.
Johnston I.
Wake I.
Marcus I.
Bonin Is.
Volcano Is.
Ladrone Is.
Yap
Pelew Is.
Mariana Is.
Guam
Caroline Is.
Ponape
Mortlock Is.
Duke of York I.
New Britain
New Ireland
Admiralty Is.
Bismarck Archipelago
New Guinea
Solomon Is.
New Caledonia
Loyalty Is.
New Hebrides
Santa Cruz
Banks Is.
Torres Is.
Queensland
New Zealand
Australia
Tasmania
Norfolk I.
Lord Howe I.
Kermadec Is.
Auckland Is.
Campbell I.
Macquarie I.
Antipodes Is.
Bounty Is.
Chatham Is.
Pitcairn I.
Oeno I.
Ducie I.
Easter I.
Sala y Gomez
Juan Fernandez
Galapagos Is.
Cocos I.
Malpelo I.
Gorgona I.
Gallego I.
Chincha Is.
Lobos Is.
Hood I.
Clipperton I.
Revillagigedo Is.
Socorro I.
Clarion I.
Roca Partida
Tres Marias
Islas Alijos
Guadalupe I.
Cedros I.
Natividad I.
San Benito Is.
Cerros I.
Todos Santos
Coronados Is.
Los Coronados
Santa Rosalia
Loreto
Cape San Lucas
Magdalena B.
Margarita I.
Coronado Is.
Clarion
Socorro
Roca Partida
Clipperton
Revillagigedo
Islas Alijos
Guadalupe
Cedros
Natividad
San Benito
Cerros
Todos Santos
Coronados
Los Coronados
Santa Rosalia
Loreto
Cape San Lucas
Magdalena B.
Margarita
Coronado
Clarion
Socorro
Roca Partida
Clipperton
Revillagigedo
Islas Alijos
Guadalupe
Cedros
Natividad
San Benito
Cerros
Todos Santos
Coronados
Los Coronados
Santa Rosalia
Loreto
Cape San Lucas
Magdalena B.
Margarita
Coronado
SECT. OF TAHITI
2
Fana or Artemise Bank
Venus Pt
Mahaena Pass
Tahaata R.
Pulaiana
Vanrouty I.
Du Pinaru
Taapahie R.
Variararu I.
Opuetoura I
Boudeuse Pass
Bougainville R.
Hitiaa
Mataoa R.
Tahuotira
Faataua
Popeiha R.
Ufuofai R.
Faone Pass
Puraiatai Bank
Port Vaitoare
Utuhaihai
Parcel Pass
1
Taiarapu or Cook Anchorage
Tiarei Pass
Toharoa Pass
Tripoa
Chimney R.
Vaitoare R.
Matavia
Tuarai
Atiaue
Fugue
Vaionifa
Vaionifa Pass
Vaitia R.
R. Faitepiha
Haavini Valley
Mt Tapiro
Vaitoco R.
Mt Aitomovahine
Taiarapu
Matavai
Aiurua Valley
Mt Teiehe
Aiurua Pass
Rauri Mt
Vaiote R.
Mt Vavahi
Tehua roto
Tomotai Pass
Mt Matarohia
Vaihoa R.
Teruru
Tapuaeha Reef
Tapuaeha Pass
Vaiau Pass
Hitia R.
Hitia Pass
Tiarei
Papeete
Papeete Pass
Papeete Harbor
Papeete Reef
Papeete Pass
Papeete Harbor
Papeete Reef
Papeete Pass
Papeete Harbor
Papeete Reef

PLATE 209.

Plate 209.

Northwest shore of Tahiti, from Point Venus to Papieté Pass, from A. Chart 1382, scale two miles to the inch.

PLATE 211.

PLATE 211.

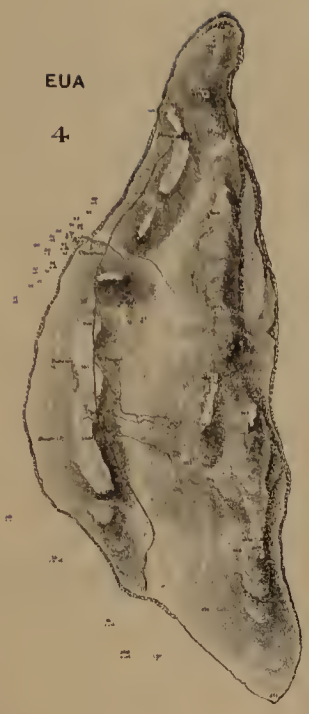
Track of "Albatross" from the Society Islands to Niue.

PLATE 212.

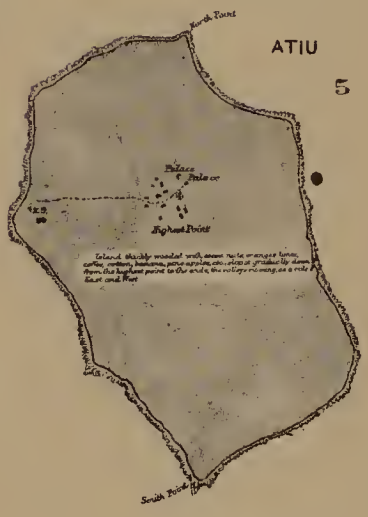
Plate 212.

1. Niue, from A. Chart 1176, scale six miles to the inch.
2. Aitutaki, from A. Chart 1264, scale two and one-half miles to the inch.
3. Palmerston Islands, from A. Chart 1176, scale two miles to the inch.
4. Eua, from A. Chart 1385, scale four miles to the inch.
5. Atiu, from A. Chart 1264, scale four miles to the inch.
6. Nukufetau, from A. Chart 766, scale four miles to the inch.
7. Niutao, from A Chart 987, scale two miles to the inch.
8. Nurakita, from A. Chart 766, scale one third of a mile to the inch.

NIUE
1

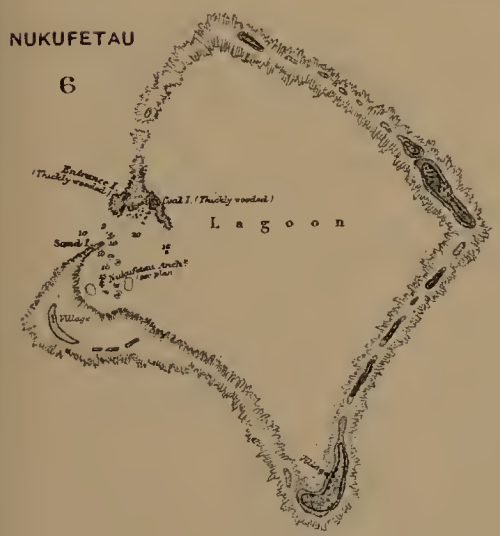

EUA
4

PALMERSTON
3


ATIU
5

AITUTAKI
2
Lagoon
thickly studded with coral knolls
Mangers
Reef
Rotoaitakuru
Rapoka
Motuakau
Likopua
Moaiu

NIUTAO
7
Best Landing Place
(Niutao)


NUKUFETAU
6
Lagoon
Coral I. (Thickly wooded)
Sand I.
Village

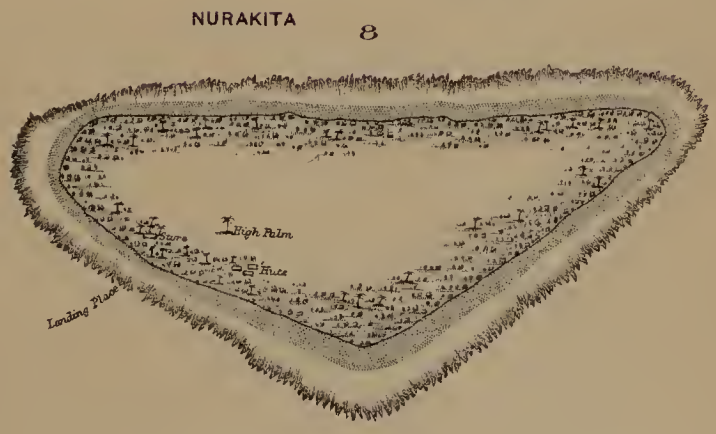

NURAKITA
8
High Palm
Landing Place

PLATE 213.

PLATE **213**.

Track of the "Albatross," Niue to Fiji.

PLATE **214**.

PLATE **214**.

The Tonga Archipelago, from A. Chart 2421.

PLATE 215.

Plate 215.

Tongatábu, from A. Chart 2363, scale five miles to the inch.

PLATE 216.

Plate 216.

Nomuka group, from A. Chart 471, scale one and one-fourth miles to the inch.

PLATE 217.

PLATE **217**.

Haapai group, southern part, from A. Chart 3100.

PLATE 218.

PLATE 218.

Haapai group, northern part, from A. Chart 3099.

PLATE 219.

PLATE 219.

Vavau group, from A. Chart 3098.

PLATE 220.

PLATE 220.

The Fiji Islands, from A. Chart 2691.

PLATE **221**.

PLATE **221.**

Track of the "Albatross," from the Fiji Islands through the Ellice group.

PLATE 222.

PLATE 222.

Funafuti, from A. Chart 2983, scale one and one-half miles to the inch.

PLATE 223.

PLATE 223.

Track of the "Albatross" through the Gilbert Islands.

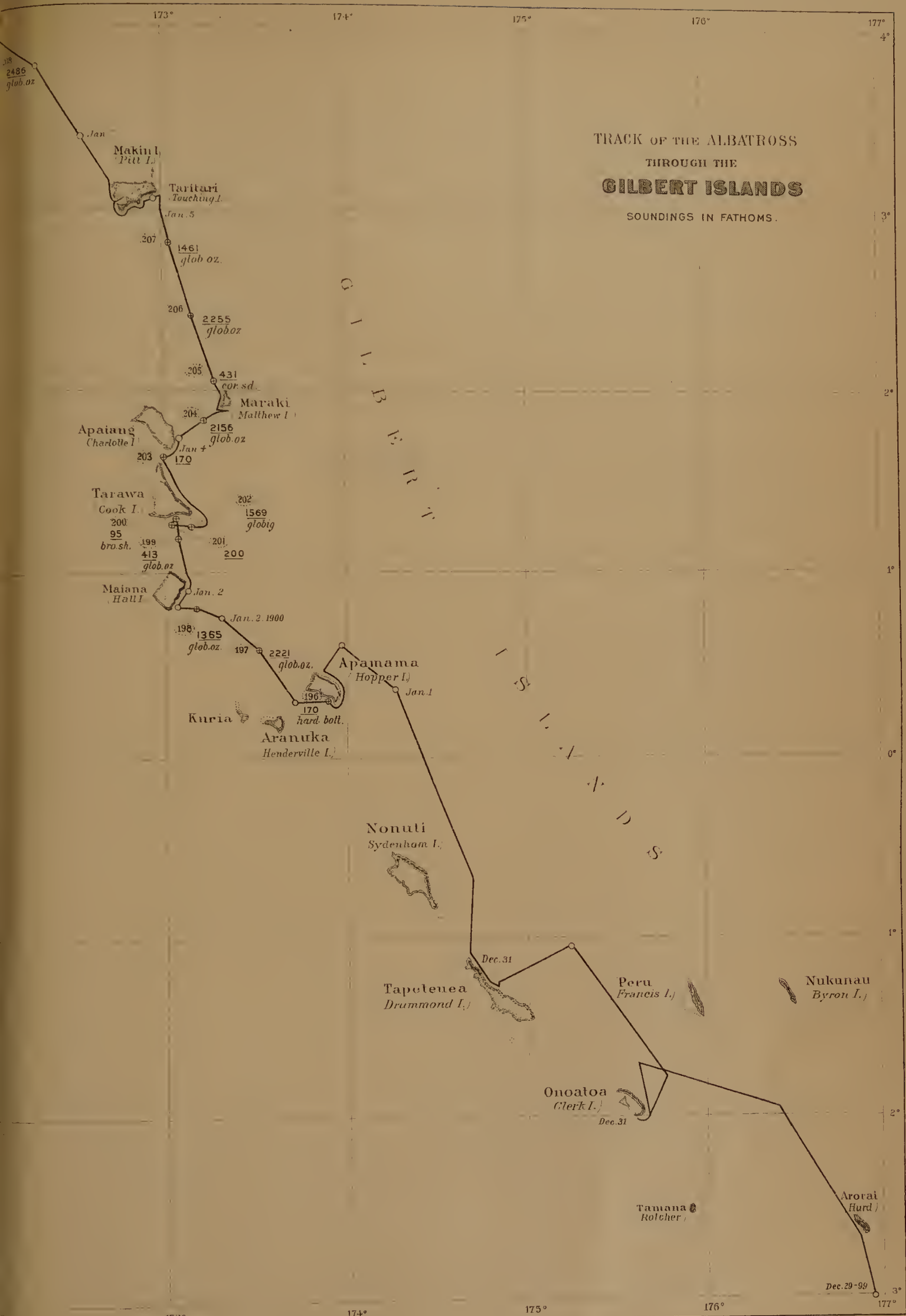

TRACK OF THE ALBATROSS
THROUGH THE
GILBERT ISLANDS
SOUNDINGS IN FATHOMS.
173°
174°
175°
176°
177°
4°
3°
2°
1°
0°
1°
2°
3°
2486 glob.oz
Jan
Makin I.
Pitt I.
Taritari
Touching I.
Jan. 5
207
1461 glob oz.
206
2255 globoz
205
431 cor. sd.
Maraki
Matthew I.
204
Apaiang
Charlotte I.
2156 glob.oz
Jan 4
203
170
Tarawa
Cook I.
202
1569 globig
200
95 bro.sh.
199
413 glob.oz
201
200
Maiana
Hall I.
Jan. 2
Jan. 2. 1900
198
1365 glob.oz.
197
2221 glob.oz.
Apamama
Hopper I.
Jan. 1
196
170 hard bott.
Kuria
Aranuka
Henderville I.
Nonuti
Sydenham I.
Dec. 31
Tapetenea
Drummond I.
Peru
Francis I.
Nukunau
Byron I.
Onoatoa
Clerk I.
Dec. 31
Tamana
Rotcher
Arorai
Hurd I.
Dec. 29-99
GILBERT ISLANDS

PLATE 224.

Plate 224.

1. Funafuti Island, eastern horn and secondary lagoon of Funafuti, from A. Chart 2
   scale one third of a mile to the inch.
2. Apaiang, from A. Chart 732, scale four miles to the inch.
3. Maraki, from A. Chart 732, scale three and one-half miles to the inch.
4. Taritari, from A. Chart 732, scale four miles to the inch.
5. Tarawa, from A. Chart 732, scale five miles to the inch.
6. Maiana, from A. Chart 732, scale three and one-half miles to the inch.

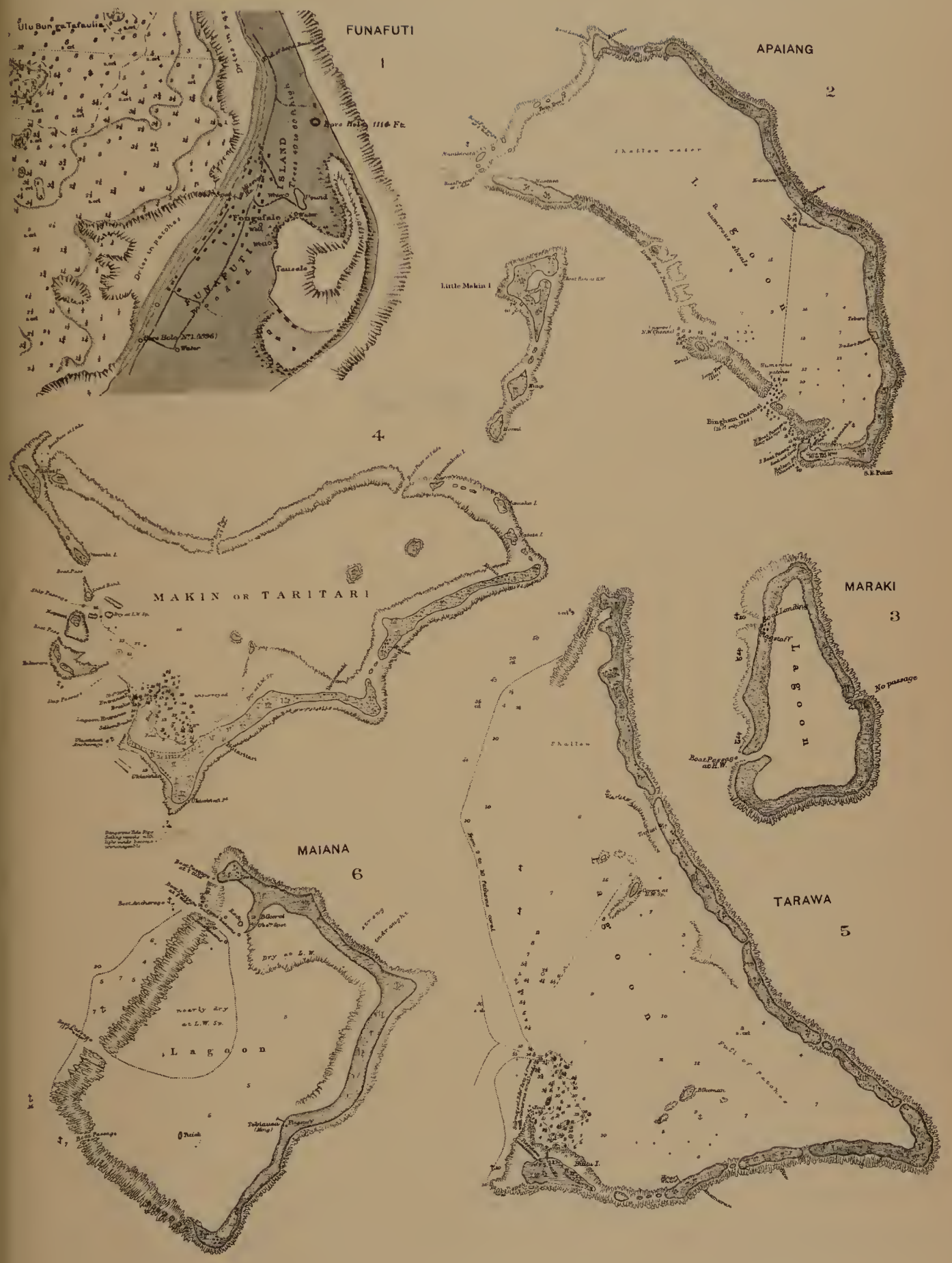

FUNAFUTI
1
Ulu Bun
Tafaulia
Boro Hole 1114 Ft.
ISLAND
Fongafale
Tuvaala
FUNAFUTI
Boro Hole 371 (1896)
Water
APAIANG
2
Little Makin I
Lagoon
Numerous Heads
Shallow water
Bingham Channel
S.E. Point
MAKIN OR TARITARI
4
MARAKI
3
Lagoon
No passage
Boat Passage at H.W.
Shallow
TARAWA
5
Lagoon
Buoy
MAIANA
6
Lagoon
nearly dry at L.W. Sp.
Dry at L.W.
Boat Anchorage
Tabiauea (King)
Flagstaff

PLATE 225.

Track of the "Albatross" through the Marshall Islands and to Ponapi (Carolines).

PLATE 226.

Plate 226.

1. Tapeteuea, from H. O. Chart 120, scale four miles to the inch.
2. Apamama, from A. Chart 731, scale four miles to the inch.
3. Peru, from H. O. Chart 497, scale four miles to the inch.
4. Jemo, from German Hydrog. Bureau, No. 113; scale eight miles to the inch.
5. Ailinglap, scale eight miles to the inch.
6. Jaluit, scale seven miles to the inch.
7. Lib, scale eight miles to the inch.
8. Rongelab, scale ten miles to the inch.
9. Lai, scale five miles to the inch.
10. Namorik, scale eight miles to the inch.

5–10 from German Hydrog. Bureau, No. 113.

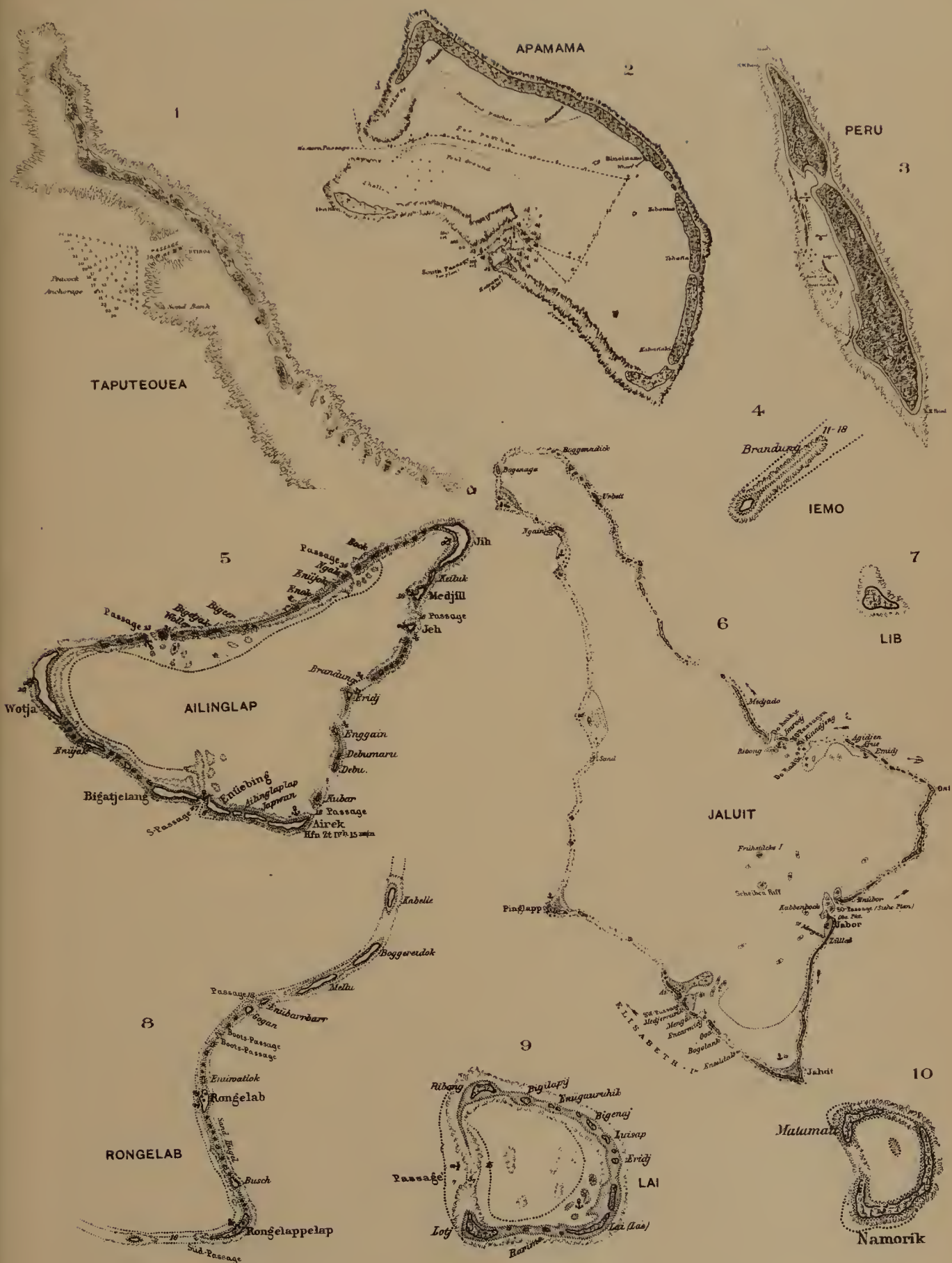

1
TAPUTEOUEA
2
APAMAMA
3
PERU
4
Brandung
11-18
IEMO
5
Jih
Kelluk
Medjsill
Passage
Jeh
Brandung
Eridj
Enggain
Debumaru
Debu.
Aubar
Passage
Airek
AILINGLAP
Wotja
Bigatjelang
6
Boggenadick
Bogenage
Ngair
Pinglapp
JALUIT
Medjado
Jahdit
7
LIB
8
Isabelle
Boggeredok
Mellu
Rongelab
RONGELAB
Busch
Rongelappelap
Süd-Passage
9
Ribang
Bigilapij
Bigenaj
Luisap
Eridj
LAI
Passage
Loij
Lai (Las)
10
Matumam
Namorik

PLATE 227.

Plate 227.

1. Namu, German Hydrog., No. 113; scale five miles to the inch.
2. Kwajalong, scale thirteen miles to the inch.
3. Taongi, scale eight miles to the inch.
4. Wotje Island (Wotje), scale one mile to the inch.
5. Pingelap, Carolines (A. Chart 772), scale one and one-fourth miles to the inch.

2–4 from German Hydrog. Bureau, No. 113.

PLATE 228.

Plate 228.

1. Wotje, German Hydrog., No. 113; scale six miles to the inch.
2. Jaluit, Southeast Pass, corrected by officers of the "Albatross," scale one-half mile to the inch.
3. Likieb, corrected by officers of the "Albatross," scale nine miles to the inch.
4. Arhno, corrected by officers of the "Albatross," scale five miles to the inch. An excellent sketch of Arhno has just been published by the German Hydrographic Bureau (1902).

2–4 from German Hydrog. Bureau, No. 113.

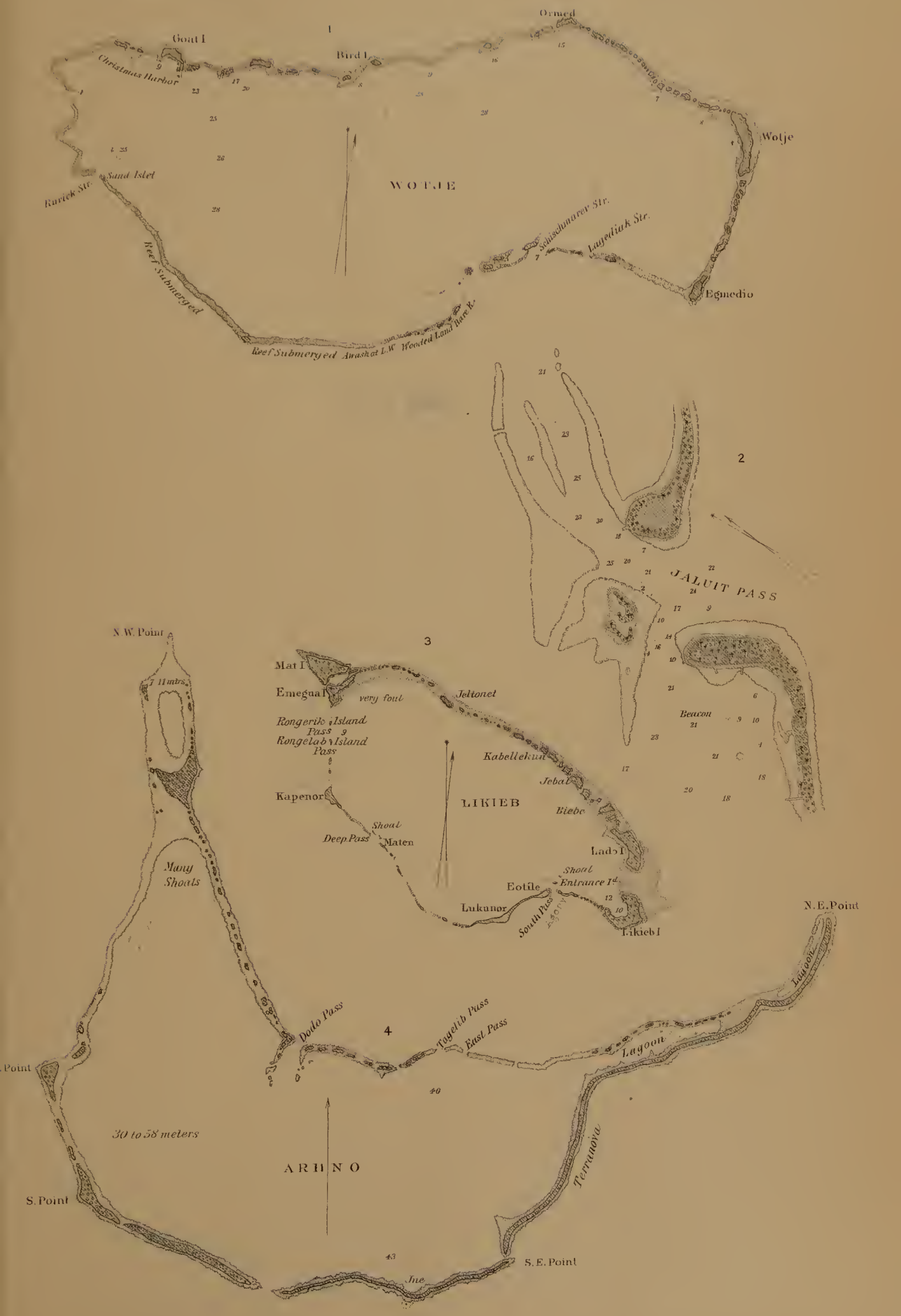

1
Ormed
Goat I
Bird I
Christmas Harbor
Wotje
WOTJE
Sand Islet
Rarick Str.
Reef Submerged
Schischmarev Str.
Lagediack Str.
Egmedio
Reef Submerged Awash at L.W. Wooded Land Bare K.
2
JALUIT PASS
Beacon
3
N.W. Point
Mat I
Emegual
very foul
Jeltonet
Rongerik Island Pass
Rongelab Island Pass
Kapenor
LIKIEB
Kabellekun
Jebat
Biebe
Shoal
Deep Pass
Maten
Lady I
Many Shoals
Shoal
Entrance I.
Eotile
Lukunor
South Pass
Likieb I
N.E. Point
Lagoon
Pado Pass
4
Tagelib Pass
East Pass
Lagoon
Terranova
30 to 58 meters
ARNO
S. Point
S.E. Point
Ine

PLATE 229.

Plate 229.

Kusaie, or Ualan, Carolines, from A. Chart 878, scale one and one-fourth miles to the inch.

PLATE 230.

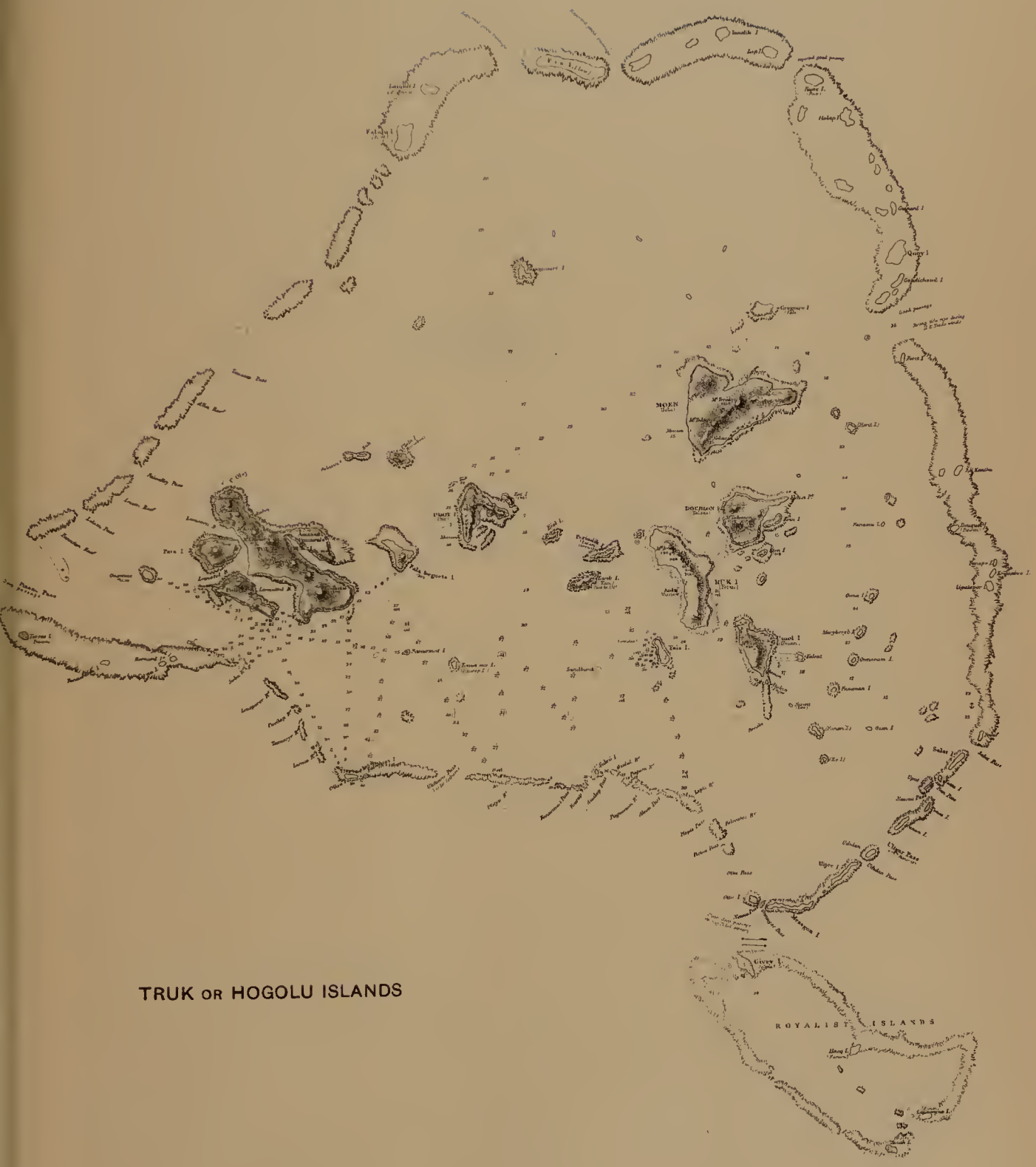
Plate 230.

Ponapi and the Andema Islands, from A. Chart 981, scale four and one-fourth miles to the inch.

PLATE 231

PLATE 231.

Truk and the Royalist Islands, from A. Chart 982, scale seven miles to the inch.



TRUK OR HOGOLU ISLANDS

PLATE 232.

PLATE 232.

Track of the "Albatross" west of Ponapi, through Truk to Guam.

PLATE 233.

Plate 233.

1. Namonuito, from A. Chart 772, scale twelve miles to the inch.
2. Feys, or Tromelin Island, from A. Chart 772, scale three fourths of a mile to the inch
3. Losap, from A. Chart 982, scale two miles to the inch.
4. Guam, from A. Chart 1748, scale six miles to the inch.
5. Rota, from A. Chart 1748, scale three miles to the inch.

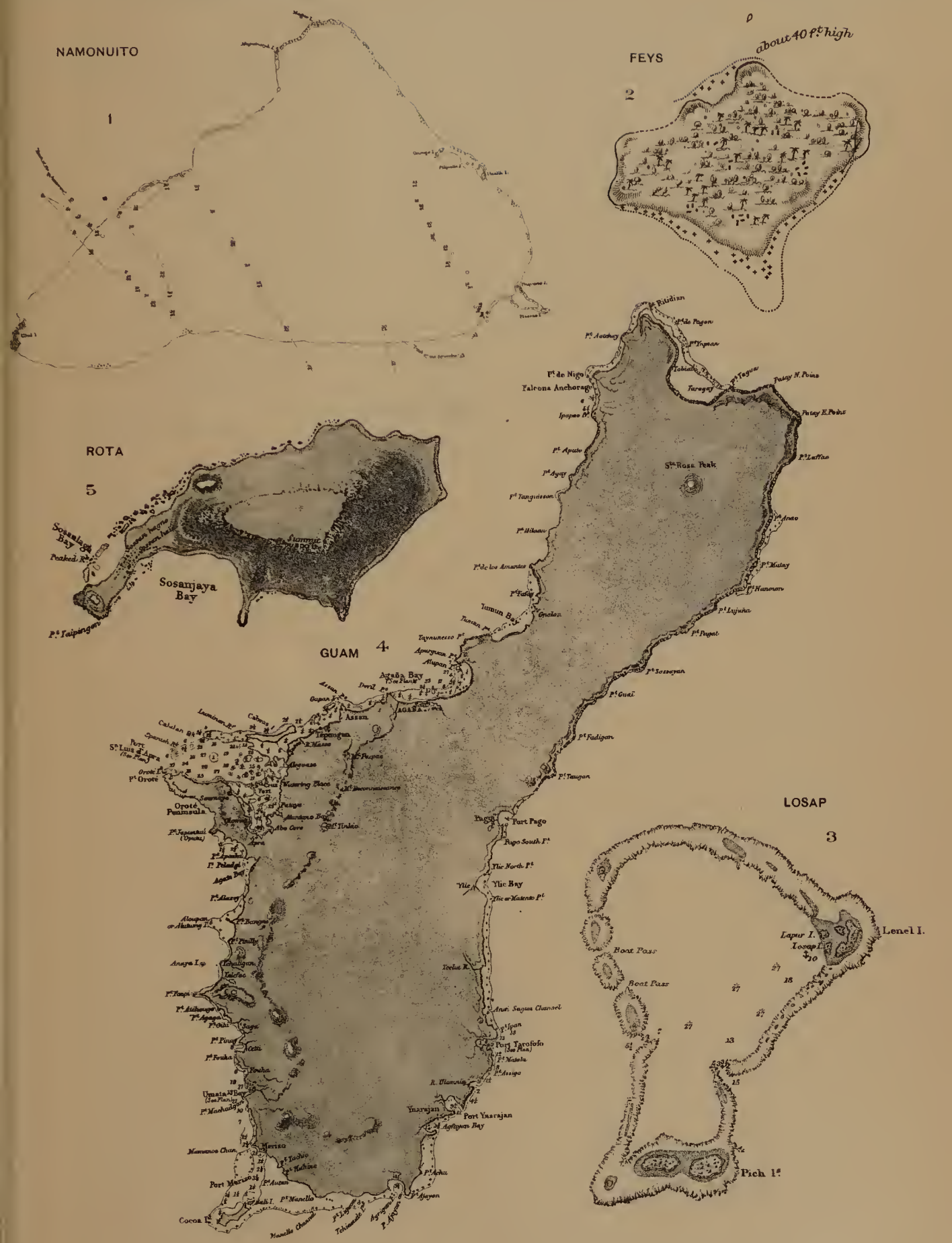

NAMONUITO
1
FEYS
2
about 40 ft high
ROTA
5
Sosanjaya Bay
Sosanjaya Bay
GUAM
4
Agaña Bay
AGAÑA
Port Pago
Ylic Bay
Port Yarajan
Port Merizo
Umatac Bay
Oroté Peninsula
LOSAP
3
Lapur I.
Losap I.
Lenel I.
Boat Pass
Boat Pass
Pich I.
Falcona Anchorage
St. Rose Peak

PLATE 234.

Plate 234.

Geological Chart of the islands in the tropical Pacific:

Yellow, coral reefs, underlying base not known.

Blue, volcanic islands.

Carmine, elevated limestones.

Blue and carmine, volcanic islands surrounded by reefs, partly elevated.

Green, coral reefs, probably underlaid by rocks of nearest land.

Blue and yellow, volcanic islands surrounded by encircling reefs.

PLATE 235.

PLATE 235.

Bora Bora. Drawn by J. H. Emerton, from sketches by A. Agassiz and A. G. Mayer.

PLATE 236.

Plate 236.

Pinaki (Whitsunday). Drawn by J. H. Emerton, from sketches by A. Agassiz and A. G. Mayer

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